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# Recent developments, challenges and opportunities in commodity markets

**Note by the UNCTAD secretariat**

*Executive summary*

The present background note reviews recent developments in key commodity markets and analyses factors that contributed to the trends in commodity prices observed in 2017. Commodity markets displayed diverse patterns in 2017. While prices of minerals, ores and metals increased, in particular during the second half of the year, prices of food commodities and agricultural raw materials decreased significantly. Overall, commodity prices remained significantly below their peak values of 2011. The background note, therefore, explores some policy issues related to recent developments in global commodity markets and suggests recommendations that could help commodity-dependent developing countries to achieve sustainable development and inclusive growth.

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## Introduction

1. In its paragraph 208, the Accra Accord gave a mandate to the Trade and Development Board of the United Nations Conference on Trade and Development (UNCTAD) to establish a multi-year expert meeting on commodities. The mandate was reaffirmed in paragraph 17 of the Doha Mandate of 2012, which extended it to 2016, and in paragraph 100 of the Nairobi Maafikiano, adopted at the fourteenth session of the Conference in 2016, which further extended the mandate through 2020. The present meeting is the tenth session of the Multi-year Expert Meeting on Commodities and Development. The topics for the session were approved at a meeting of the extended Bureau of the Trade and Development Board, held on 22 November 2017, and endorsed by the Trade and Development Board at its sixty-sixth executive session.

2. This background note analyses commodity market developments during 2017, with a special focus on price trends and the underlying causes of price fluctuations. It also highlights some policy issues associated with recent market developments and draws lessons in the form of policy recommendations to assist commodity-dependent developing countries in their efforts to achieve inclusive economic growth and sustainable development. The background note groups commodities into three categories, namely: (a) food and agricultural commodities (food, tropical beverages, vegetable oil seeds and oils, and agricultural raw materials); (b) minerals, ores and metals; and (c) energy (oil, gas, coal and renewable energy).

# I. Recent developments in commodity markets

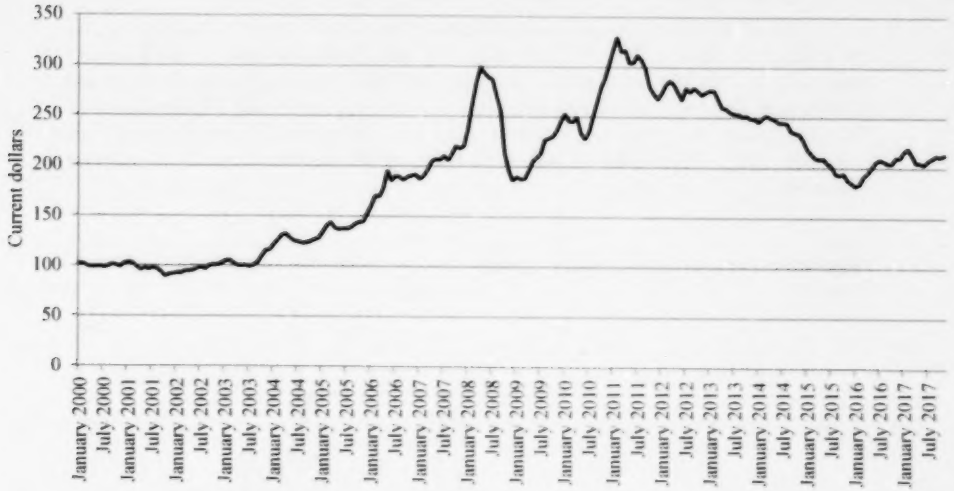
## A. Overview

3. The UNCTAD non-oil nominal commodity price index[1] stood at 216.5 points in January 2017, which constituted an increase of 19.1 per cent from its January 2016 value of 181.8 points (figure 1). During the first half of 2017, the UNCTAD non-oil nominal commodity price trended downward, reaching 203.5 points in June, before a trend reversal driven by rising prices of minerals, ores and metals brought the index up to 212.7 points in November 2017. Overall, commodity prices remained significantly lower than at the peak of the last commodity boom in the 2000s.

4. While commodity prices increased across the board in 2016, the picture in 2017 was much more complex. On the one hand, the prices of minerals, ores and metals significantly increased in 2017, driven by strong demand and concerns over supply for some base metals. On the other, the upward trend in prices of food and agricultural raw materials that began in 2016 reversed in 2017. On energy markets, the most notable development in 2017 was the rise of the price of oil to a two-year high, triggered by supply cuts agreed to by major Organization of the Petroleum Exporting Countries and non-member producers, first in December 2016 and extended subsequently in May 2017 and again in November 2017 (see chapter I, section B.3).

[1] The UNCTAD non-oil nominal commodity price index covers the following subgroups of commodities: all foods (food, tropical beverages, vegetable oilseeds and oils), agricultural raw materials and minerals, ores and metals.

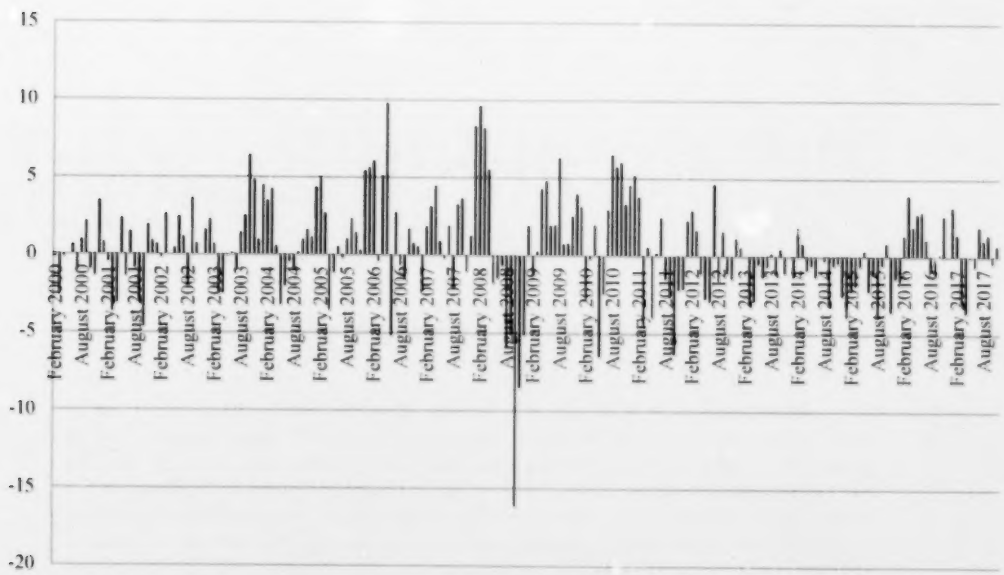
Figure 1
**UNCTAD non-oil commodity price index, January 2000–November 2017**
(2000 = 100)




*Source*: UNCTAD secretariat calculations based on data from UNCTADstat.

5. Commodity price fluctuations have been moderate in the past five years (figure 2). The last time the UNCTAD non-oil nominal commodity price index recorded a monthly swing of more than 5 per cent was in October 2011. However, individual commodities have experienced substantial price fluctuations. The following section reviews market developments in major commodity groups.

Figure 2
**Monthly fluctuations of the UNCTAD non-oil nominal commodity price index, February 2000–November 2017**
(2000=100)




*Source*: UNCTAD secretariat calculations based on data from UNCTADstat.

## B. Developments in key commodity sectors

### 1. Food and agricultural commodities

6. The UNCTAD food price index reached its lowest value in seven years, at 191.1 points, in January 2016. For the following six months, the index trended upward mainly due to El Niño-related adverse weather conditions that caused output shortfalls and uncertainties. Since mid-2016, food prices have been fluctuating around a downward trend. All subindices of the UNCTAD food price index saw marked losses between January and November 2017, with tropical beverages experiencing the sharpest drop, at -8.8 per cent (figure 3).

Figure 3
**Price indices of selected commodity groups, January 2000–November 2017**
(2000=100)

*Source:* UNCTAD secretariat calculations based on data from UNCTADstat.

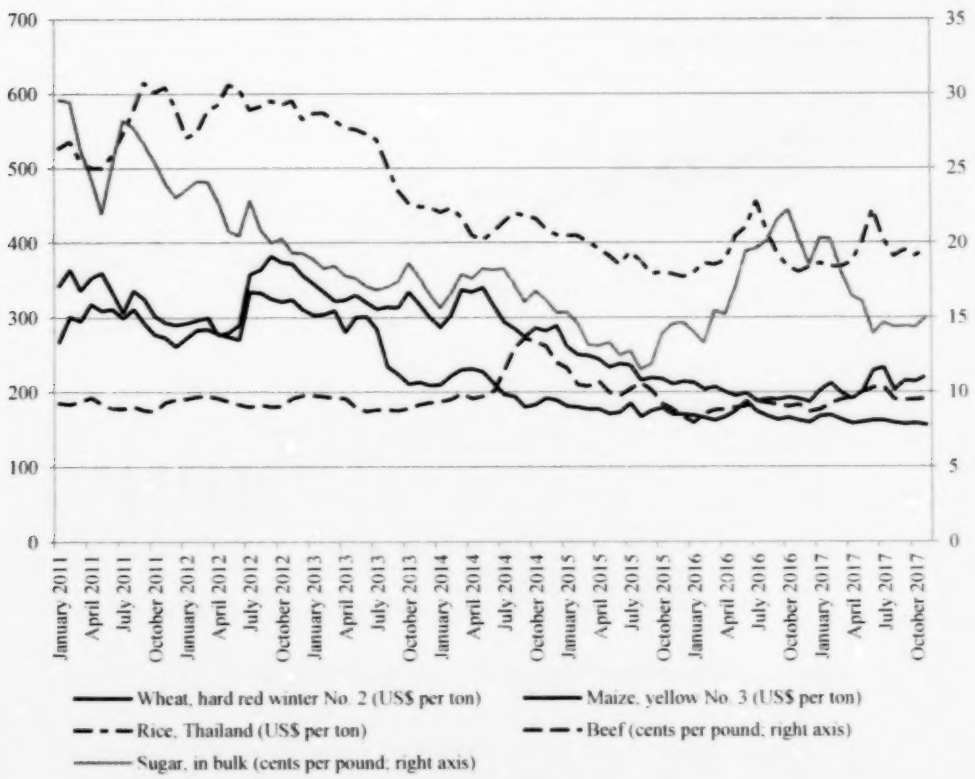
7. Grain prices have been generally trending downward since 2012, mainly due to strong production and increasing stocks (figure 4). The 2016/17 season marked a record production of wheat and maize, leading to the largest-ever recorded global supply of grains. As a consequence, the price of maize (yellow No. 3) reached its lowest level in more than a decade, at $156 per ton in November 2017. The price of wheat (hard red winter No.2) stood at $191 per ton in April 2017, down 4.5 per cent year-on-year, but thereafter climbed to $233 per ton in July 2017 due to concerns over drought affecting yields in Canada and the United States of America. In November 2017, the price of wheat stood at $221 per ton, 8.9 per cent higher than in January 2017.

8. Going forward, grain markets are expected to remain fairly stable, subject to favourable weather conditions. The International Grains Council projects wheat and maize production for the 2017/18 season at 749 million tons and 1,040 million tons, respectively, slightly below the levels in the 2016/17 season.[2] Strong demand forecast is projected to lead to a moderate reduction of maize stocks, which could generate a mild price increase, while wheat stocks are expected to increase slightly, despite growing consumption.

9. Rice markets saw a brief price rally in the second quarter of 2017, when the price of Thai rice increased by 18.7 per cent, from $375 per ton in April to $445 in June, fuelled by heightened import demand and the finalization of the Government's programme to liquidate rice stocks (figure 4). Thereafter, the price of Thai rice receded and stood at $390 per ton in November 2017, 4.8 per cent higher than in January 2017. The market outlook for rice remains calm, with production forecasts only slightly below the record crop of the 2016/17 season.

10. Sugar markets are forecast to feature a global supply surplus in the 2017/18 season, following two seasons of deficit. Consequently, the price of sugar (average of International Sugar Agreement daily prices) followed a downward trend in 2017 and fell by 26.3 per cent, from 20.33 cents per pound in January 2017 to 14.98 cents per pound in November 2017 (figure 4). Going forward, forecasts of a record global supply suggest that price increases are not to be expected for the upcoming season despite growing demand.

Figure 4
**Nominal prices of selected food and agricultural commodities, January 2011–November 2017**



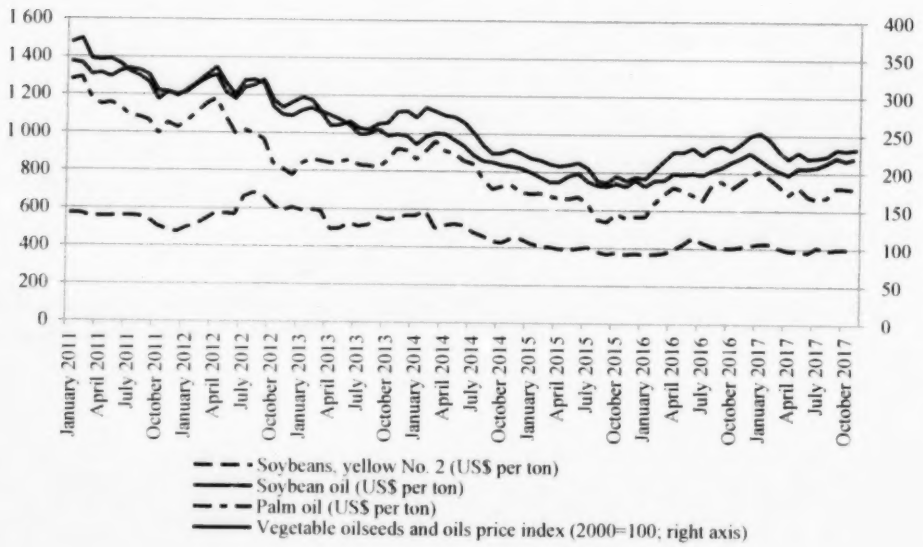

*Source*: UNCTAD secretariat calculations based on data from UNCTADstat.

[2] International Grains Council, 2017, Grain Market Report No. 483, 23 November.

11. The price of Australian and New Zealand frozen beef reached its all-time high in September 2014, at 272 cents per pound, due to tight supply conditions. Thereafter, rising supply and weakening demand triggered a downward trend through 2016. In 2016, beef markets showed less volatility and a moderate upward price trend in the first half of the year, followed by a mild downward trend in the second half of 2016. Fuelled by strong demand, the price of beef increased by 16.9 per cent, from 177 cents per pound in January 2017 to 207 cents per pound in July 2017, but levelled off to 191 cents per pound in November 2017. Going forward, price increases seem unlikely based on projections showing strong supply.

12. The UNCTAD vegetable oilseeds and oils price index showed a downward trend between August 2011 and September 2015, losing 42.7 per cent of its value during the period (figure 5). In 2016, this trend somewhat reversed, owing to shortfalls in production of oilseeds such as soybeans in South America and palm oil in South-East Asia, due to adverse weather conditions caused by El Niño. Projections of a record production for soybeans for the 2016/17 growing season led to a decline in prices of vegetable oilseeds and oils during the first quarter of 2017, and prices have remained relatively low throughout 2017. In November 2017, the vegetable oilseeds and oils price index averaged 232 points, 2.3 per cent down on a year-on-year basis. Forecasts for 2017/18 show increasing demand but also rising total oilseed production, and thus prices are expected to remain fairly stable.

Figure 5
**Prices of selected commodities in vegetable oilseeds and oils market, January 2011–November 2017**




*Source:* UNCTAD secretariat calculations based on data from UNCTADstat.

13. The price index of tropical beverages followed a downward trend in 2017, averaging 177 points in November 2017, down 8.8 per cent from January 2017 (figure 6). The decrease in the composite index in 2017 was largely driven by a substantial drop in coffee prices, with robusta and arabica coffees dropping by 14.5 per cent and 12.7 per cent, respectively, between January and November 2017. Amid benign weather conditions and healthy supply forecasts for major producing countries, the International Coffee Organization composite indicator price fell by 15.7 per cent, from 139 cents per pound in January 2017 to 117 cents per pound in November 2017. Forecasts of healthy production

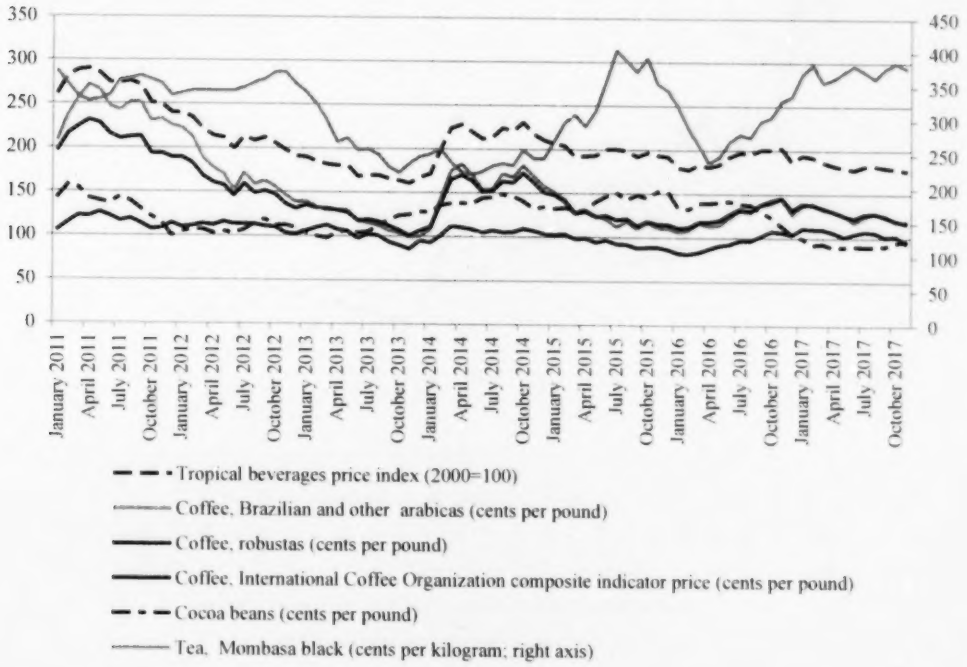
during the 2017/18 growing season indicate that price increases are unlikely over the medium-term unless unfavourable weather conditions impact on harvests.

14. The price of cocoa beans started to trend downward in July 2016 amid predictions of increasing production in West Africa and a forecast supply surplus for the 2016/17 season. Fuelled by expectations of significant production increases in Côte d'Ivoire and Ghana, and a record supply surplus, the price of cocoa beans averaged 89 cents per pound, its lowest level in almost a decade. The price of cocoa beans remained subdued throughout the second and third quarters of 2017, and thereafter moderately increased to 96 cents per pound in November 2017, based on concerns over excess rain in Côte d'Ivoire that had spread crop diseases. Overall, the cocoa market is expected to remain in surplus, and cocoa bean prices are therefore unlikely to increase significantly in the near future.

15. The markets for tea have been characterized by a high degree of variability over the past two years. In July 2015, the price of Mombasa black tea reached an all-time high average of 403 cents per kilogram. Thereafter, the price plummeted to 238 cents per kilogram in April 2016, a drop of 41 per cent in nine months. After another trend reversal in mid-2016, the price of Mombasa black tea averaged 378 cents per kilogram in November 2017, up 15.1 per cent on a year-on-year basis. The price of tea is expected to remain volatile in 2018, as weather-related risks in the main growing regions make supply forecasts difficult.

Figure 6

**Prices trends of selected tropical beverage commodities, January 2011–November2017**




*Source*: UNCTAD secretariat calculations based on data from UNCTADstat.

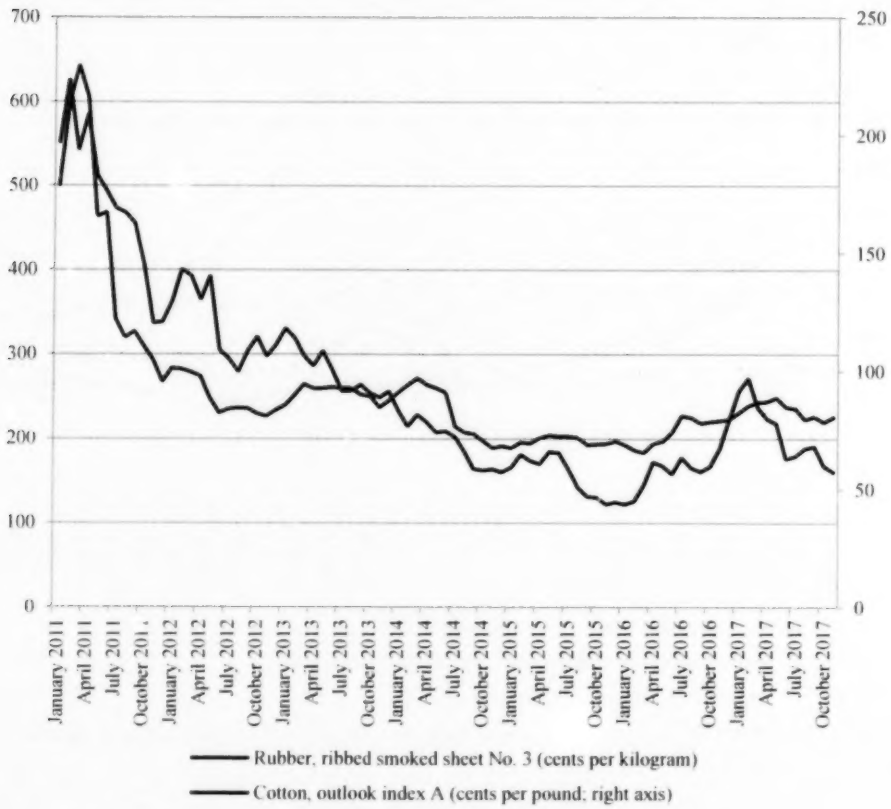
16. Prices of agricultural raw materials followed a steep downward trend between the peak of the commodity boom period in 2011 and 2015 (figure 7). For instance, the price of rubber (ribbed smoked sheet No. 3) plummeted from 626 cents per kilogram in February 2011 to 165 cents per kilogram in January 2015, a decrease of 73.6 per cent. In March 2016, major producers, including Indonesia, Malaysia and Thailand, set in force an export quota scheme, which induced a trend reversal and brought the rubber price up to 223 cents per kilogram in April 2017. However, rubber prices dropped again thereafter and stood at 160 cents per kilogram in November 2017. In December 2017, the Governments of

Indonesia, Malaysia and Thailand decided to withhold exports of 350,000 tons of rubber through 31 March 2018, which can be expected to stabilize prices in the near term.

17. The price of cotton (cotton outlook index A) declined by 70.7 per cent, from 230 cents per pound at the peak of the last commodity price boom in March 2011 to 67 cents per pound in January 2015. Thereafter, prices remained essentially flat through March 2016 when an upward trend set in. The cotton outlook index A reached 89 cents per pound in May 2017, which constituted a 26.1 per cent increase on a year-on-year basis, before receding to 80 cents per pound in November 2017. The International Cotton Advisory Committee predicts global production to increase by 11 per cent to 25.4 million tons in 2017/18, slightly higher than the projected global demand of 25.2 million tons;[3] hence, also taking significant global stocks into consideration, a decrease in the cotton price in 2018 seems likely.

Figure 7

**Price trends of selected commodities in agricultural raw materials markets, January 2011–November 2017**




*Source:* UNCTAD secretariat calculations based on data from UNCTADstat.

## 2. Minerals, ores and metals

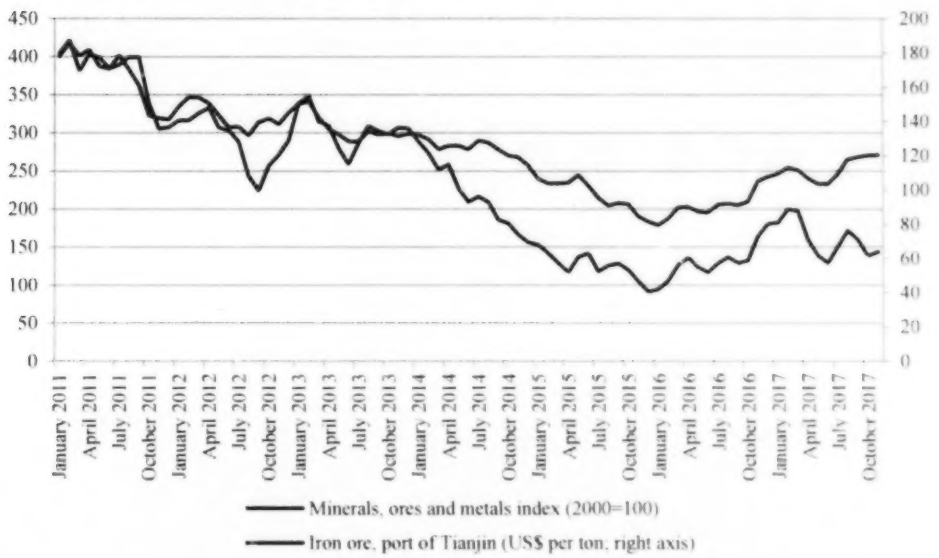
18. Mineral, ore and metal prices trended downward for almost five years following their peak in early 2011. Between February 2011 and January 2016, the UNCTAD minerals, ores and metals price index fell from 418 points to 178 points, corresponding to a

[3] International Cotton Advisory Committee, 2018, Global cotton consumption projected to increase in 2017/18, 3 January. Available at https://www.icac.org/Press-Release/2018-(1)/PR-1-2018-Global-Consumption-Increasing.

loss of 57.3 per cent.[4] The downward trend was broken in 2016 with the price index reaching 239 points in December 2016. This price rally was mainly driven by supply cuts and uncertainties, in particular in the markets for nickel, copper and zinc. On a year-on-year basis, the UNCTAD minerals, ores and metals price index gained 37.8 per cent in January 2017. This upward trend was briefly interrupted at the end of the first quarter, but resumed at the beginning of the third quarter. The UNCTAD minerals, ores and metals price index stood at 271 points in November 2017, up 10.1 per cent from 246 points in January 2017 (figure 8).

19. The price of iron ore is strongly driven by consumption in China, as the country imports more than two thirds of total seaborne iron ore. In particular, steel production in China is an important indicator of the demand for iron ore. As growth in steel production in China slowed in 2014 and turned negative in 2015, the price of imported iron ore at the port of Tianjin lost 70.3 per cent of its value, from $136 per dry ton in December 2013 to $40 per dry ton in December 2015 (figure 8). Thereafter, the price of iron ore picked up and almost doubled between January and December 2016, based on recuperating demand from China and reduction of output from high-cost mines. Weakening demand for steel in China and oversupply concerns caused a drop in the price of iron ore, to $57 per dry ton in May 2017. The iron ore price was volatile during the second half of 2017 and stood at $64 per dry ton in November 2017, 21.1 per cent lower than in January 2017. Going forward, favourable supply conditions and projections of low growth for steel demand in 2018 make substantial price increases unlikely in the near future.

Figure 8
**Minerals, ores and metals price index and iron ore nominal price**




*Source*: UNCTAD secretariat calculations based on data from UNCTADstat.

20. The price of copper at the London Metal Exchange reached its highest level ever recorded, at $9,867 per ton, in February 2011. Thereafter, an extended downward trend brought the copper price down to just over half of its peak level at $4,458 per ton in January 2016 (figure 9). Between June 2016 and February 2017, the price of copper rallied by 28.3 per cent, while another growth spurt starting in May 2017 brought the price of copper to $6,828 per ton in November 2017. Expectations of strengthening growth in

[4] The index covers copper, aluminium, iron ore, nickel, lead, zinc, tin, phosphate rock, manganese ore and tungsten ore. Gold is not included.

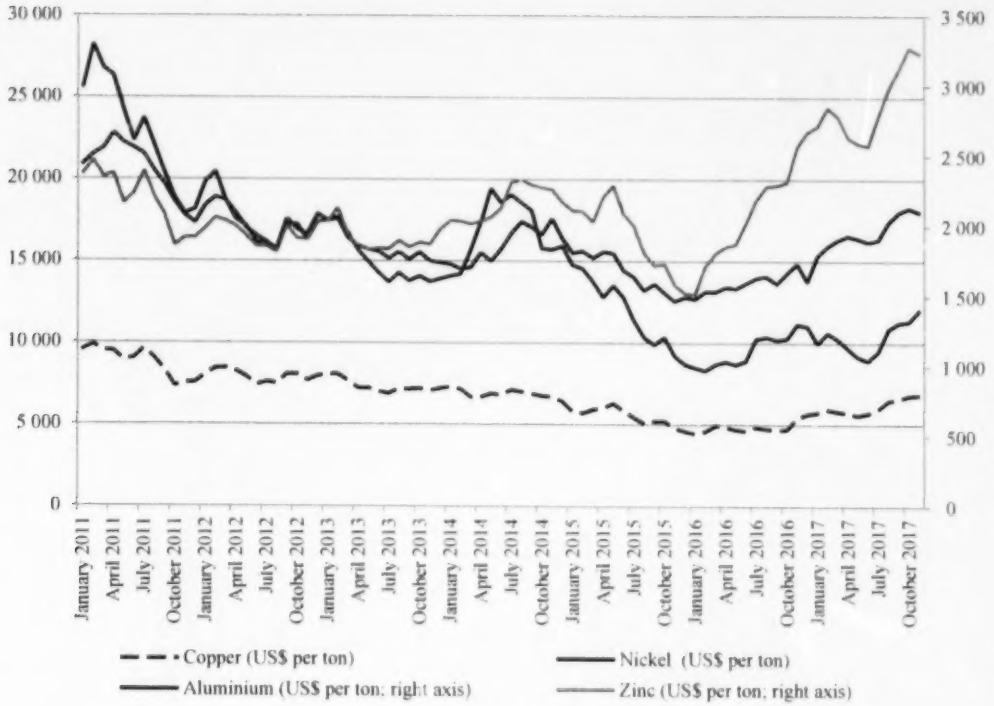
demand from China and concerns over supply disruptions were key fundamental factors driving the upward price trend. With the demand and supply forecast of the International Copper Study Group projecting a copper deficit for 2018, a further increase in the price of copper seems likely.

21. The price of aluminium fluctuated around an upward trend in 2016 and 2017, based on strong demand growth and closures of aluminium smelters in China. Between January 2016 and November 2017, the London Metal Exchange aluminium price increased by 42.0 per cent, from $1,479 per ton to $2,101 per ton in November 2017 (figure 9). Looking ahead, a potential deficit in global aluminium markets in 2018 could induce further price increases.

22. The price of nickel showed a brief deviation from its general downward trend in early 2014, when Indonesia implemented a ban on exports of unprocessed ore. After the Philippines increased nickel exports, in particular to China, the price of nickel resumed its downward trend, which persisted until early 2016 (figure 9). As a consequence, the London Metal Exchange nickel price lost 56.4 per cent of its value, from $19,047 per ton in July 2014 to $8,306 per ton in February 2016. Thereafter, mine shutdowns in the Philippines due to environmental concerns drove the price of nickel up to $11,010 per ton in December 2016, before receding to $8,928 per ton in June 2017. In the second half of 2017, nickel followed the general trend of rising base metal prices, increasing by 26.5 per cent from $9,479 per ton in July 2017 to $11,990 per ton in November 2017. With demand expected to remain strong in 2018, further price increases seem likely.

23. The price of zinc has been on an upward trajectory since the beginning of 2016, with a brief interruption in the first half of 2017 (figure 9). Mine closures and production cutbacks in conjunction with expectations of strong demand from China that led to a supply deficit were the main reasons for the zinc price rallying by 88.4 per cent between January 2016 and February 2017, when it reached its highest level since October 2007, at $2,848 per ton. After a brief period of falling prices between February and April 2017, the price of zinc continued to rise amid falling global zinc stocks, reaching $3,236 per ton in November 2017. Going forward, as the zinc market is expected to remain in deficit in 2018 despite new mine supply entering the market, further price increases seem likely.

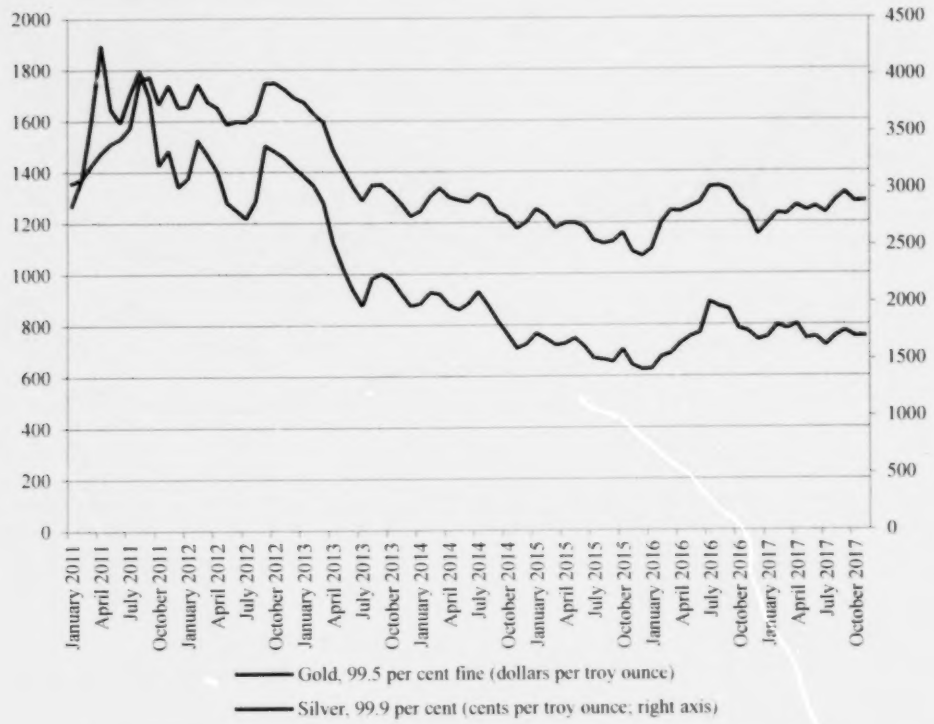
Figure 9
**Nominal prices of selected minerals, ores and metals, January 2011–November 2017**




*Source*: UNCTAD secretariat calculations based on data from UNCTADstat.

24. Precious metal prices increased significantly in the first half of 2016, driven by geopolitical and macroeconomic uncertainty and low interest rates in major economies (figure 10). Gold and silver prices decreased in the last quarter of 2016 amid the Federal Reserve Board of the United States of America raising the policy rate and a strengthening of the United States dollar. In 2017, the price of gold was volatile and stood at $1,282 per troy ounce in November 2017, 7.5 per cent higher than in January 2017. The price of silver was more volatile than the price of gold in 2017, averaging 1,698 cents per troy ounce in November 2017, only slightly higher than at the beginning of the year. Going forward, further increases in the policy rates of the United States remain a key downside risk to the price of precious metals, while upside risks include geopolitical conditions and potentially a weaker United States dollar.

Figure 10
**Nominal prices of gold and silver, January 2011–November 2017**




*Source*: UNCTAD secretariat calculations based on data from UNCTADstat.

## 3. Energy

*Crude oil*

25. The price of crude oil has been characterized by a high degree of variability over the past decade. Between January 2007 and May 2017, the average spot price of Brent crude oil[5] fluctuated between $133.9 per barrel and $30.8 per barrel (figure 11). The lowest price during this period, $30.8 per barrel, was recorded in January 2016 and constituted the lowest value since December 2003. Between June 2014 and January 2015, the oil price plummeted by 56.7 per cent, from $107.0 per barrel to $48.4 per barrel. Since then, the oil price has, overall, remained at depressed levels.

26. The main driver of the price collapse in late 2014 was an oversupply on the market that had its roots in the massive increase of shale oil production in North America, increasing production in other producers not members of the Organization of the Petroleum Exporting Countries and a slowdown of growth in crude oil demand. The build-up of large crude oil inventories compounded the supply–demand imbalance. According to data from the United States Energy Information Administration, global oil production increased from 93.7 million barrels per day in July 2014 to 97.5 million barrels per day in July 2015, with production by non-members of the Organization of the Petroleum Exporting Countries accounting for 46 per cent of the 3.8 million barrels per day increase in global production. Global consumption only increased by 2.6 million barrels per day in the same period, leading to a substantial increase in inventories.

[5] Henceforth referred to as the oil price.

27. As a reaction to the falling oil price, the Organization of the Petroleum Exporting Countries decided at its ministerial conference on 30 November 2016 to cut production by 1.2 million barrels per day starting in January 2017, with Saudi Arabia implementing the largest production cut, at 486,000 barrels per day. The production cuts were the basis of a deal signed on 10 December 2016 with major producers not members of the Organization, including the Russian Federation, in which non-member producer countries agreed to cut production by 558,000 barrels per day. The agreement to curtail production had a short-term impact, with the oil price rising by 20.0 per cent, from $46.4 per barrel in November 2016 to $55.5 per barrel in February 2017, before levelling down to $46.9 per barrel in June 2017.

28. On 25 May 2017, both the Organization of the Petroleum Exporting Countries and non-member producers decided to extend the production cuts, which had been limited to June 2017 in the original agreement, through March 2018. These supply cuts were a key driver of a steep rise of the oil price that reached $62.6 per barrel in November 2017, its highest level in more than two years. On 30 November 2017, the agreement to cut production was further extended to the end of 2018. The continued impact of these supply cuts will depend both on the degree of compliance as well as the extent to which oil producers that are not party to the agreement will step up output. For instance, the United States increased production by 4.7 per cent, from 14.71 million barrels per day in January 2017 to 15.4 million barrels per day in May 2017, which offset almost 40 per cent of the production cuts led by the Organization of the Petroleum Exporting Countries. While there might be technical and other limitations to further short-term production increases in the United States, the production cut agreed in May 2017 seems unlikely to be substantial enough to drive the oil price up to the levels of early 2014 on its own. In addition, inventories remain at high levels, which makes sharp increases in the oil price seem unlikely. In terms of upside risk, expectations of stronger demand growth could support a stronger oil price going forward.

*Natural gas*

29. Markets for natural gas have traditionally been regionalized due to physical limits to transport and different contractual arrangements prevailing in different regions. This has led to the coexistence of various reference prices that differ markedly at times and occasionally move in opposite directions. For instance, in February 2012, the border price in Germany for one million metric British thermal units (Btu) of natural gas from the Russian Federation was $12.22, while the price at the Henry Hub terminal in Louisiana was only $2.53 per million metric Btu.

30. The Henry Hub natural gas price, often cited as a global benchmark, reached $1.70 per million metric Btu in March 2016 (figure 11), which was the lowest level in more than 20 years, mainly owing to low consumption due to a mild winter. Thereafter, the Henry Hub natural gas price fluctuated around an upward trend, and the price averaged $2.87 per million metric Btu in October 2017. The United States Energy Information Administration forecasts demand for consumption and exports to outpace supply in 2018, leading to lower inventory levels. Hence, further increases of the Henry Hub natural gas price seem likely going forward.

31. Looking further ahead, the rapid expansion of liquefied natural gas infrastructure and new technology are likely to lead to a higher degree of global market integration. Global liquefaction capacity stood at 340 million tonnes per annum in January 2017, almost double its value of 171 million tonnes per annum in 2005.[6] With the construction of liquefaction capacity of over 100 million tonnes per annum expected in 2017, primarily in Australia and the United States, liquefaction capacity is expected to continue to grow at a rapid pace. In 2015, liquefied natural gas accounted for 32.5 per cent of global trade in natural gas.[7] Over the medium term, increased liquefied natural gas capacities could contribute to a convergence in natural gas prices.

*Coal*

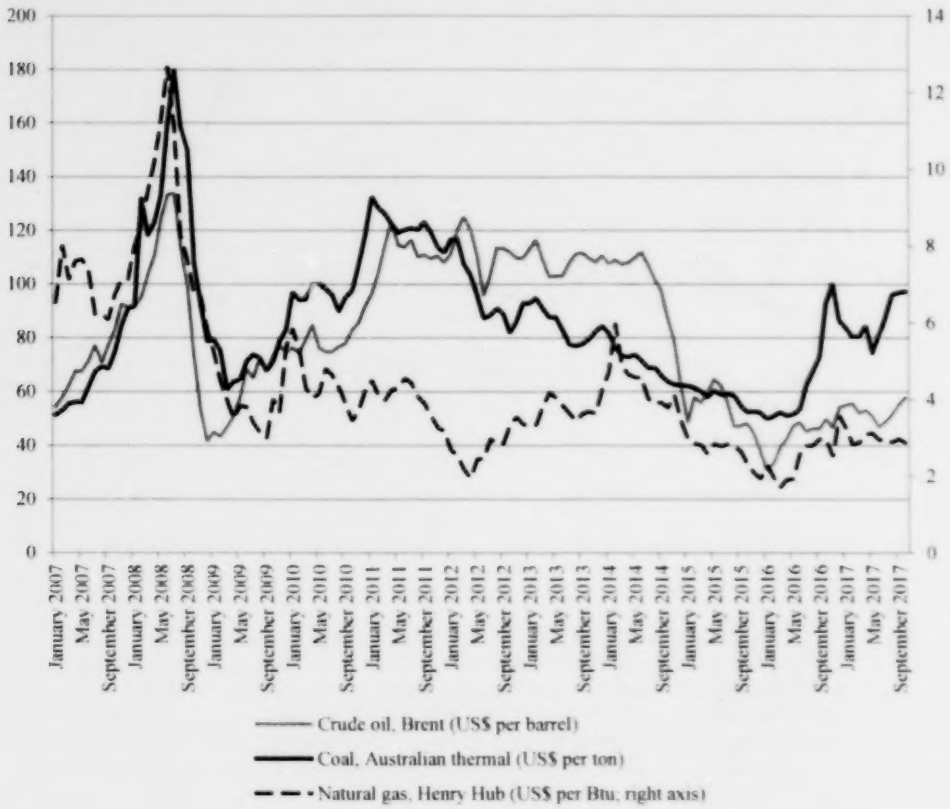
32. Coal continues to be the primary fuel for electricity generation at the global level. In addition, coal is a key source of thermal energy for the steel and cement industries. As coal is also responsible for 45 per cent of energy-related carbon emissions, reducing its share in the global energy mix remains a key challenge in the context of climate change mitigation. According to forecasts by the International Energy Agency, the share of coal in power generation is on a downward trajectory, and is expected to drop from 41 per cent in 2014 to 36 per cent in 2021.

33. The price of Australian thermal coal fluctuated around a downward trend between early 2014 and mid-2016, which was mainly driven by persistent oversupply and sluggish import demand from China. Thereafter, the price of coal experienced a sharp increase, from $56 per metric ton in June 2016 to $111 per metric ton in November 2016, based on tightened supply and increased import demand from China, where domestic production was cut to reduce oversupply and increase profitability in the coal sector. After supply conditions improved, mainly due to a partial rollback of production restrictions in China, the price of coal receded to $81 per metric ton in June 2017. In the second half of 2017, strong demand from China and other Asian countries caused an increase of the price of coal, to $97 per metric ton in October 2017. Looking ahead, in light of ample supply capacity, further increases in the price of coal seem unlikely.

[6] International Gas Union, 2010, *World Liquefied Natural Gas Report* (Barcelona, Spain); International Gas Union, 2017, *World Liquefied Natural Gas Report* (Barcelona, Spain).

[7] Based on data from BP, 2016, *Statistical Review of World Energy* (London).

Figure 11
**Crude oil (petroleum), coal and natural gas prices, January 2007–October 2017**



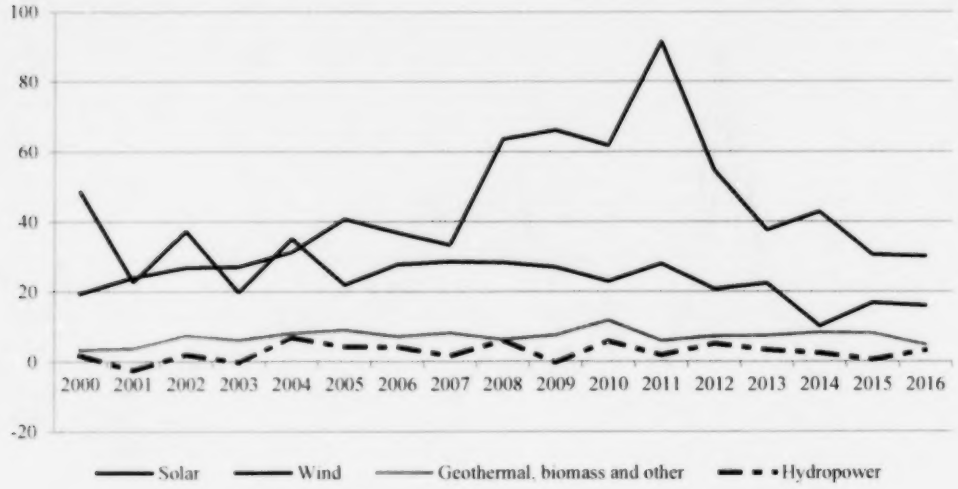

*Source*: UNCTAD secretariat calculations based on data from UNCTADstat and World Bank Global Economic Monitor Commodities database (accessed 14 January 2018).

*Renewable energy*

34. The International Energy Agency projects global renewable electricity capacity to expand by over 920 gigawatts between 2017 and 2022, an increase of 43 per cent. Substantial capacity growth in onshore wind and solar photovoltaics contributed to a record growth in renewable electricity capacity of almost 165 gigawatts in 2016.[8] For more than a decade, solar photovoltaics showed the highest growth rate in terms of renewable energy consumption followed by wind (figure 12). China continues to account for the largest share of global expansion in renewable energy sources, with large additions both in onshore wind and photovoltaic capacity. The capacity for renewables is growing in many countries and regions, including India, the United States and the European Union.

[8] International Energy Agency, 2017, Executive summary, *Renewables 2017: Analysis and Forecasts to 2022*, Market Report Series.

Figure 12
**Annual growth rates of renewable energy consumption by type**




*Source*: UNCTAD secretariat calculations based on data from BP, 2017, *BP Statistical Review of World Energy*, June.

35. The growing deployment of renewable energy technologies has led to significant reductions in costs, which has enhanced the competitiveness of renewables in comparison with fossil fuels. For instance, onshore wind has become one of the cheapest sources of electricity with a levelized cost of electricity[9] of $0.07 per kilowatt hour for plants commissioned in 2016,[10] lower than that from coal-fired power plants in member States of the Organization for Economic Cooperation and Development.[11] Further potential cost reductions in renewables over the medium term are substantial, with the levelized cost of electricity of solar photovoltaics, concentrated solar power and offshore wind potentially dropping by 59 per cent, 43 per cent and 35 per cent, respectively, by 2025.[12]

36. Continued expansion of renewables is a key building block for the achievement of the 2030 Agenda for Sustainable Development and the aim to keep the increase in the global average temperature to "well below 2°C above pre-industrial levels and pursuing efforts to limit the temperature increase to 1.5°C above pre-industrial levels" (article 2 of the Paris Agreement under the United Nations Framework Convention on Climate Change). Expanding the generation of renewable energy also has the potential to dramatically increase access to electricity in rural areas in developing countries, helping them to achieve Sustainable Development Goal 7 on energy, which aims at ensuring access to affordable, reliable, sustainable and modern energy for all. In this context, a supportive policy environment remains crucial for renewables, in particular in the light of low fossil fuel prices.

[9] Levelized cost of electricity is a summary measure of the overall competitiveness of different generating technologies. It represents the per-kilowatt-hour cost of building and operating a generating plant over an assumed financial life and duty cycle (see United States Energy Information Administration, 2017, available at https://www.eia.gov/outlooks/aeo/pdf/electricity_generation.pdf).

[10] International Renewable Energy Agency, 2017, Renewable power: Sharply falling generation costs. Available at https://www.irena.org/-/media/Files/IRENA/Agency/Publication/2017/Nov/IRENA_Sharply_falling_costs_2017.pdf.

[11] International Renewable Energy Agency, Renewable power generation costs in REMAP 2030. Available at http://wasaproject.info/docs/IRENA_REmap2030/REmap-FactSheet-7-Cost+Competitive.pdf.

[12] International Renewable Energy Agency, 2016, *The Power to Change: Solar and Wind Cost Reduction Potential to 2025*.

## II. Some policy issues arising from recent market developments

37. The volatility of international commodity markets over the past decade highlights the importance of diversification and strengthening domestic value addition through structural transformation for commodity-dependent developing countries. These aspects are treated in depth in an accompanying report, prepared for the 2018 session of the Multi-year Expert Meeting on Commodities and Development, which focuses on diversification and value addition.[13] Other key policy issues related to recent developments on commodity markets include links between commodity dependence and the Sustainable Development Goals, the importance of considering potential developments on international commodity markets when designing domestic commodity sector policies and the role of renewables in sustainable development.

### A. Promoting inclusive development in commodity-dependent developing countries

38. There are several direct and indirect linkages between developments in the international commodity markets and the Sustainable Development Goals. For instance, commodity price shocks can impact both food security and poverty indicators in developing countries. In this context, it should be noted that the extent to which developments in international commodity markets affects economic and social conditions in developing countries depends on existing policy frameworks. Policies such as social safety nets can mitigate the negative impact of commodity price shocks on the low-income segments of a population, while redistributive policies are needed to ensure windfall revenue is more widely shared.

39. The experience of some countries during the commodity boom of the 2000s could be seen as illustrative. In this regard, between 2004 and 2010, Zambia, a major exporter of copper, experienced annual average gross domestic product per capita growth of above 5 per cent, driven by the sharp increase in global copper prices. During the same period, however, official data indicate that the poverty head count ratio and the prevalence of undernourishment increased, from 56.7 and 48.5 per cent to 64.1 and 51.7 per cent of the population, respectively.[14] This example demonstrates that there is no automatic process linking commodity price booms with improvements in the living conditions of the poor in commodity-dependent developing countries. Rather, policies should be adopted to ensure that upward commodity price movements contribute to meeting the Sustainable Development Goals.

### B. Ensuring efficient risk management in domestic commodity sector policies

40. When designing national commodity sector policies, the links between international commodity markets and local conditions need to be considered. In this context, managing risks due to unanticipated commodity price movements is of key importance. Recent developments in the cocoa sector in Côte d'Ivoire provide important lessons in this regard. As part of reforms in the cocoa sector a mechanism of forward selling anticipated crop and guaranteed minimum producer prices was introduced. At the beginning of the 2016/17 marketing season, when the international price of cocoa stood at 123 cents per pound, the Government set producer prices at around 85 cents per pound. However, the price of cocoa thereafter plummeted to 90 cents per pound in July 2017. Many traders who had agreed to buy cocoa in advance defaulted on their contracts as the margin between producer prices and international market prices was not sufficient to make a profit. Consequently, the

[13] TD/B/C.I/MEM.2/42.

[14] World Bank, World Development Indicators database. Available at https://datacatalog.worldbank.org/dataset/world-development-indicators (accessed 13 February 2018).

livelihoods of many smallholder farmers who depended on cocoa as their main source of income were threatened.[15]

41. Equitable risk sharing along the value chain and efficient overall risk management are crucial to avoid excessive hardship in case of unfavourable international commodity price developments. Risk management tools could include insurance mechanisms or stabilization funds. In general, commodity sector policies should aim at ensuring that commodity price movements do not harm the most vulnerable segments of the population.

## C. Promoting and benefiting from a transition towards sustainable energy

42. Low fossil fuel prices represent an obstacle to the expansion of renewables. Particularly in electricity generation, there is direct competition between natural gas and coal, on the one hand, and renewable energy sources such as wind and solar photovoltaics, on the other. A supportive policy environment is therefore crucial to maintain momentum for a transition towards sustainable global energy architecture. This includes scaling back harmful and costly subsidies for fossil fuels, which the International Monetary Fund estimated at $5.3 trillion in 2015.[16] Also, policies supporting the deployment of renewables, such as setting targets for the share of renewables in the national energy mix and ensuring access to finance for investments in renewables, remain important.

43. Beyond its contribution to climate change mitigation, renewable energy expansion can also contribute to development objectives, including achievement of the 2030 Agenda for Sustainable Development. Globally, more than 1 billion people still do not have access to electricity. Renewable energy solutions can help to provide access to clean energy where it is lacking, for instance in remote areas where there is no grid connection. More generally, a transition towards cleaner and renewable energy sources can entail many benefits in terms of lower environmental pollution, health benefits and reduced dependence on a single source of energy.

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[15] The issue was covered broadly in the media. See, for example, *Reuters*, 2017, Ivory Coast [Côte d'Ivoire] slashes cocoa farmers' price for mid-crop, 30 March, available at https://www.reuters.com/article/us-cocoa-ivorycoast/ivory-coast-slashes-cocoa-farmers-price-for-mid-crop-idUSKBN1712QA; AllAfrica, 2017, West Africa: Falling cocoa prices threaten child labour spike in Ghana, Ivory Coast [Côte d'Ivoire], 12 June, available at http://allafrica.com/stories/201706160709.html; and *Bloomberg*, 2017, Ivory Coast [Côte d'Ivoire] cuts cocoa farmers pay by third for main harvest, 2 October (available at https://www.bloomberg.com/news/articles/2017-10-01/ivory-coast-cuts-cocoa-farmers-pay-by-third-for-main-harvest). See also International Cocoa Initiative, 2017, Briefing paper, 22 June.

[16] International Monetary Fund, 2015, How large are global energy subsidies? Working Paper 15/105.

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# Diversification and value addition

**Note by the UNCTAD secretariat**

*Executive summary*

This note outlines the challenges faced by commodity-dependent countries that are vulnerable to volatile commodity export prices. The note discusses the reasons why commodity dependence can have negative effects on growth and development in a country and identifies which individual commodities and commodity groups display the most volatile prices. Based on the classification of 191 countries into different commodity export dependence groups, and the level of concentration of each country's exports, the note finds a statistically significant relationship between concentration, the level of development (as proxied by country group) and the type of commodity each country exports. This indicates that the type of commodity dependence matters for development. The note concludes with a brief discussion of horizontal and targeted policy measures to foster economic and export diversification in commodity-dependent countries.

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# I. Introduction

1. The Nairobi Maafikiano (TD/519/Add.2, paragraph 57) emphasizes the importance of economic diversification into modern, sustainable and more technologically advanced productive activities, as well as the production of higher value products. This is considered essential for sustainable long-term growth and for building resilience to the shocks that periodically affect the economic performance of developing countries and countries with economies in transition. Diversification is particularly important for the most vulnerable developing countries, such as small island developing States and the least developed countries. More generally, diversification and value addition are vital for commodity-dependent countries,[1] given their vulnerability to volatile commodity prices (see TD/519/Add.2, paragraph 59).

2. In the areas of economic and trade diversification, as well as value addition, the Nairobi Maafikiano (TD/519/Add.2, paragraph 76) and the Trade and Development Board of UNCTAD give the Organization a strong mandate to provide statistics, analytical work and technical assistance to developing countries and countries with economies in transition. In line with this mandate, the purpose of this paper is to present an empirically based analysis of diversification and value addition, including some policy suggestions on how to achieve this objective.

# II. Importance of diversification

## A. Channels through which export and economic concentration affect economic performance

3. There is ample empirical evidence linking the degree of economic and export concentration and diversification with development. Production tends to become more diversified as income increases until, at a relatively high level of income, concentration starts to increase owing to specialization.[2] Also, economies tend to become more diversified as they move out of early development stages than when they are already developed.[3] With respect to the relationship between export concentration and economic development, diversification increases as income per capita grows, but after a certain level, diversification decreases again.[4] In addition to income per capita, major determinants of export concentration include a country's size (larger countries are more diversified), distance from major markets (remote countries are less diversified) and market access.[5]

4. While most empirical studies on the relationship between concentration and development have proxied economic development by the level of income, a negative relationship between concentration in the export of commodities (that is to say, commodity dependence) and the human development index has also been found. In addition, the strength of the relationship changes with the level of commodity dependence and the type

[1] UNCTAD defines commodity-dependent developing countries as those in which more than 60 per cent of merchandise exports are commodities (UNCTAD and Food and Agriculture Organization of the United Nations, 2017, *Commodities and Development Report 2017: Commodity Markets, Economic Growth and Development* (United Nations publication, Sales No. E.17.II.D.1, New York and Geneva).

[2] See J Imbs and R Wacziarg, 2003, Stages of diversification, *American Economic Review*, 93(1): 63–86.

[3] See L De Benedictis, M Gallegati and M Tamberi, 2009, Overall trade specialization and economic development: Countries diversify, *Review of World Economics*, 145(1):37–55.

[4] O Cadot, C Carrère and V Strauss-Kahn, 2011, Export diversification: What's behind the hump? *The Review of Economics and Statistics*, 93(2):590–605.

[5] A Parteka and M Tamberi, 2013, What determines export diversification in the development process? Empirical assessment, *The World Economy*, 36(6):807–826.

of commodity on which a country depends, and the negative effect is strongest in countries where commodities account for more than 60 percent of total merchandise exports.[6,7]

5. Countries with highly concentrated productive or export capabilities are vulnerable to sector-specific shocks such as a commodity price fluctuations, or a technological change that reduces demand for the products they specialize in. Under these conditions, concentration into more volatile productive sectors and export products will result in lower growth and poor development performance. In this regard, as countries develop, productive capacity moves towards less volatile sectors leading to a situation in which more developed economies are less volatile.[8] By the same token, the low and volatile economic growth rates of commodity-dependent developing countries is related to high commodity price volatility, given these economies' strong concentration in the commodity sector.[9]

6. The negative effect of concentration on economic growth and development in volatile economic sectors such as commodities is mediated through channels such as investment. The level of national income, which is volatile owing to commodity dependence, is a key determinant of both the attractiveness and feasibility of private and public investment. This makes investment procyclical and hence volatile. Higher (lower) national income[10] resulting from a positive (negative) price shock, on the one hand, increases (reduces) the expected profitability of investment, while on the other hand, relaxing (tightening) financial constraints on investment. The effect of financial constraints on public investment in infrastructure, health, education and security are particularly well documented. The stronger the concentration of a country's production and exports on a few volatile sectors, the more vulnerable investment and growth.

7. Moreover, potential investors may perceive more concentrated economies as riskier, independently of the current value of commodity prices, thereby reducing investment ex ante. Additionally, investments that take place may be limited to those with low risk levels, high discount rates and/or short maturity. As the most productive investments – for example, those associated with higher embedded technology and productivity – generally require long maturity times, concentration may reduce such investments even more than it reduces investment in general, with a negative effect on growth and development.

8. Furthermore, a vicious circle may ensue as volatility of gross domestic product growth caused by commodity dependence results in increased concentration and commodity dependence. In some cases, reductions in national income resulting from a negative shock may lead to sociopolitical instability as a Government fails to provide basic services to its population, or as a result of adjustment policies required to adapt to economic hardship. This has a negative effect on the attractiveness of investment, especially outside the natural resource sector. In addition, if total factor productivity is positively affected by learning by doing, reduced economic activity caused by lower commodity prices and lower long-term growth leads to less learning by doing. This affects productivity growth, thereby negatively affecting the capacity of the economy to diversify and develop.

[6] JD Nkurunziza, K Tsowou and S Cazzaniga, 2017, Commodity dependence and human development, *African Development Review*, 29(S1):27–41.

[7] In the literature, commodity dependence has also been associated with dependence on commodity imports or both exports and imports. This paper focuses on the export dimension of commodity dependence, based on the traditional definition of commodity dependence by UNCTAD.

[8] M Koren and S Tenreyro, 2007, Volatility and development, *The Quarterly Journal of Economics*, 122(1): 243–287.

[9] See F Van der Ploeg and S Poelhekke, 2009, Volatility and the natural resource curse, *Oxford Economic Papers*, 61(4):727–760.

[10] In addition to affecting investment, national income changes resulting from a shock may also affect consumption, prices, employment variables (for example, unemployment, informality), poverty, inequality and many other welfare-related variables. These can be considered the direct effects of a shock such as a change in commodity prices in commodity-dependent countries.

9. High concentration can lead to a persistent distortion of the relative prices of tradables and non-tradables resulting from real exchange rate overvaluation, a phenomenon known as "Dutch disease". This occurrence can explain why high concentration may lead to lower growth and development.[11] During a persistent commodity price boom, the real effective exchange rate of a country with large commodity exports may become overvalued due to higher commodity export income and – in the case of countries more closely integrated into international capital markets – procyclical capital inflows. This effect may be caused either by a nominal exchange rate appreciation, an increase in inflation or both, reducing the relative price of tradable goods and services. This persistent distortion makes the non-resource sector of such countries less competitive and attractive for investment, negatively affecting its capacity to diversify and develop. A recent empirical study found that natural resource exports have a strong negative effect on non-resource exports and a weaker positive effect on imports, in line with the Dutch disease hypothesis.[12]

10. An additional explanation of the negative effect of commodity dependence and concentration on development concerns the negative effects that natural resource windfalls may have on institutions in these countries. An extensive literature[13] describes and analyses the different forms these negative effects may take, including rent seeking and corruption, the implementation of unsustainable policies due to pressure from interest groups, political instability and deterioration in the rule of law, among others. As institutions matter for development,[14] institutional weaknesses associated with commodity dependence may partly explain developmental challenges in commodity-dependent countries.

11. Moreover, the types of products that countries diversify into are important for development, as production and export of higher value, higher quality and productivity products is strongly associated with development.[15] Higher growth and development ensues as resources move from low-productivity sectors such as subsistence agriculture and informal services towards the production of higher productivity and higher quality goods and services (structural transformation[16]).

12. The previous discussion shows that economic and export diversification is important for development, especially if such diversification reduces vulnerability to particularly volatile sectors and products such as commodities. The next section identifies the level of volatility across commodities and commodity groups, shedding light on where action in terms of economic and export diversification is needed most.

## B. Price volatility across commodities and commodity groups

13. Figure 1 shows the real price volatility of 54 commodities, deflated by the World Bank manufactures unit value index. They are classified into four commodity groups: food, tropical beverages and vegetable oils (28 commodities); minerals, ores and metals (11 commodities); agricultural raw materials (12 commodities); and energy (3 commodities).

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[11] For a survey, see F Van der Ploeg, 2011, Natural resources: Curse or blessing? *Journal of Economic Literature*, 49(2):366–420.

[12] I Harding and AJ Venables, 2016, The implications of natural resource exports for non-resource trade, *IMF [International Monetary Fund] Economic Review*, 64(2):268–302.

[13] Reviews of this literature are JA Frankel, 2010, The natural resource curse: A survey, National Bureau of Economic Research Working Paper 15836, and van der Ploeg, 2011.

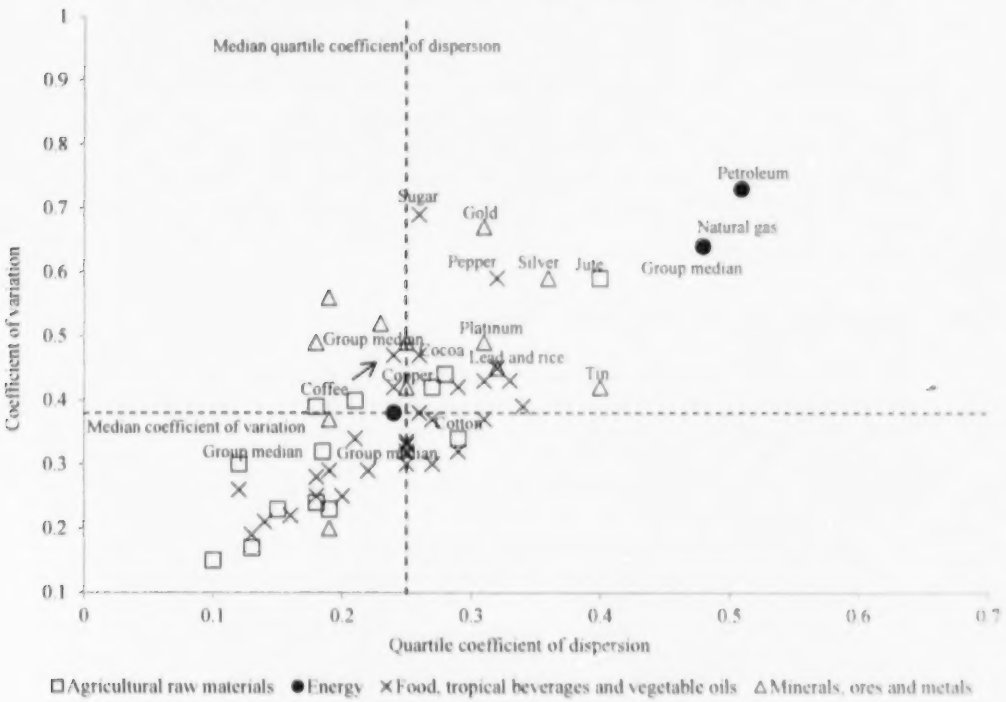
[14] See D Acemoglu, S Johnson, J Robinson and Y Thaicharoen, 2003, Institutional causes, macroeconomic symptoms: Volatility, crises and growth, *Journal of Monetary Economics*, 50(1): 49–123.

[15] See R Hausmann, J Hwang and D Rodrik, 2007, What you export matters, *Journal of Economic Growth*, 12(1): 1–25.

[16] Structural transformation can be defined in broad terms as the movement of labour from low-productivity sectors of the economy into high-productivity ones. See B Herrendorf, R Rogerson and A Valentinyi, 2014, Growth and structural transformation, in P Aghion and S Durlauf, *Handbook of Economic Growth*, 2A: 855–941 (North-Holland, Oxford) and UNCTAD, 2014, *The Least Developed Countries Report 2014: Growth with Structural Transformation – A Post-2015 Development Agenda* (United Nations publication, Sales No. Sales No. E.14.II.D.7).

14. To account for differences in the characteristics of different volatility measures, figure 1 presents two of them: the coefficient of variation and the quartile coefficient of dispersion calculated for each of the 58 commodities for the period 1960–2016. The group median of each volatility measure is also included[17] to allow a comparison of volatility among commodity groups. During the last 56 years, real commodity prices have been volatile, and that volatility has been heterogeneous both between and within groups of different individual commodities.

Figure 1
**Commodity price volatility by group, deflated by manufactures unit value, 1960–2016**




*Source*: UNCTADstat and the World Bank.

15. The median volatilities of the energy group are the highest, with crude petroleum registering the highest volatility of all products, followed closely by natural gas. The volatility of coal is much lower. The high volatility of petroleum and natural gas, combined with the large number of energy-dependent countries (see next section), highlights the need to particularly foster diversification efforts in those countries.

16. The second-highest group median volatility is that of the minerals group, influenced in particular by the three precious metals in the group: gold, platinum and silver, which are among the most volatile commodities. Hence, countries dependent on the export of precious metals, notably gold, [18] are particularly affected by export price volatility. Other commodities within this group, whose real volatility was equal to or greater than the median of all commodities, are tin and lead.

[17] Since the group medians may overlap with an individual commodity entry, as in the case of natural gas in figure 1, the group median labels in the figure appear to the left of the corresponding point, instead of above, as for individual commodities.

[18] For example, gold is the top individual export product and represents more than one third of total merchandise exports in nine countries; in Guyana and Suriname, it represents more than 50 per cent of total merchandise exports. In Burkina Faso and Mali, gold accounts for three quarters of total merchandise exports.

17. The food group has the third-highest volatility measure. Within this group, some individual products are especially volatile, such as pepper, sugar and rice, but also subgroups, such as vegetable oils – especially, high-lauric acid coconut oil and palm kernel oil – and two tropical beverages, cocoa and coffee. While this underlines the importance of diversification for the countries that are reliant on these products, it also points out the challenge posed to food security for countries that are large consumers of volatile staples such as rice.

18. The agricultural raw materials group has the lowest volatility. There is, however, significant dispersion within the group. Compared with wool, cotton and rubber, jute is the most volatile product. Cotton, which is of particular export importance for several countries,[19] is one of the most volatile commodities within this group. In these countries, policies facilitating value addition to climb the value chain towards fabrics and textile exports could be a way of reducing the risks associated with the volatility of cotton prices.

19. In summary, the heterogeneous nature of price volatility across commodity groups shown in figure 1 shows that not all commodity-dependent countries are affected by volatility equally. Although diversification and value addition are relevant for all commodity-dependent countries, they bear particular importance for countries specializing in the production and export of the most volatile commodities, for example, petroleum, gold, rice, cocoa, coffee and cotton.

## III. Nature of commodity dependence

20. The previous section discussed the hypothesis that the concentration of a country in the production and export of a limited number of commodities has a negative impact on development, particularly when such concentration is on volatile products such as primary commodities. In this section, a series of stylized facts on commodity export concentration and commodity dependence are presented, using disaggregated export data for 191 countries for the year 2016.

21. In particular, two empirical findings are discussed, one in each subsection. The first finding refers to which countries are commodity dependent and to which group of products these countries depend on based on their top exports. The second finding concerns the measure of overall export concentration and finds a statistical relationship between the level of overall export concentration and the following factors: the income group to which a country belongs (developed countries, least developed countries and other developing countries or countries with economies in transition) and the group of commodities they export (for example, energy).

### A. Classification of export commodity-dependent countries

22. Export data for 191 countries disaggregated at three digits of the Standard International Trade Classification, Rev.3 obtained from UNCTADstat are used to assess commodity export dependence. The dataset contains data for 39 developed countries, 17 countries with economies in transition and 135 developing countries, 46 of which are classified as least developed countries.[20]

23. Export shares are sensitive to commodity price movements and vary significantly for commodity-dependent countries, according to whether commodity prices are high or low during the measurement period. Therefore, the classification of countries according to their level of export dependence was based on whether or not a country's product share of

[19] Least developed countries such as Benin, Burkina Faso, the Central African Republic and Mali.

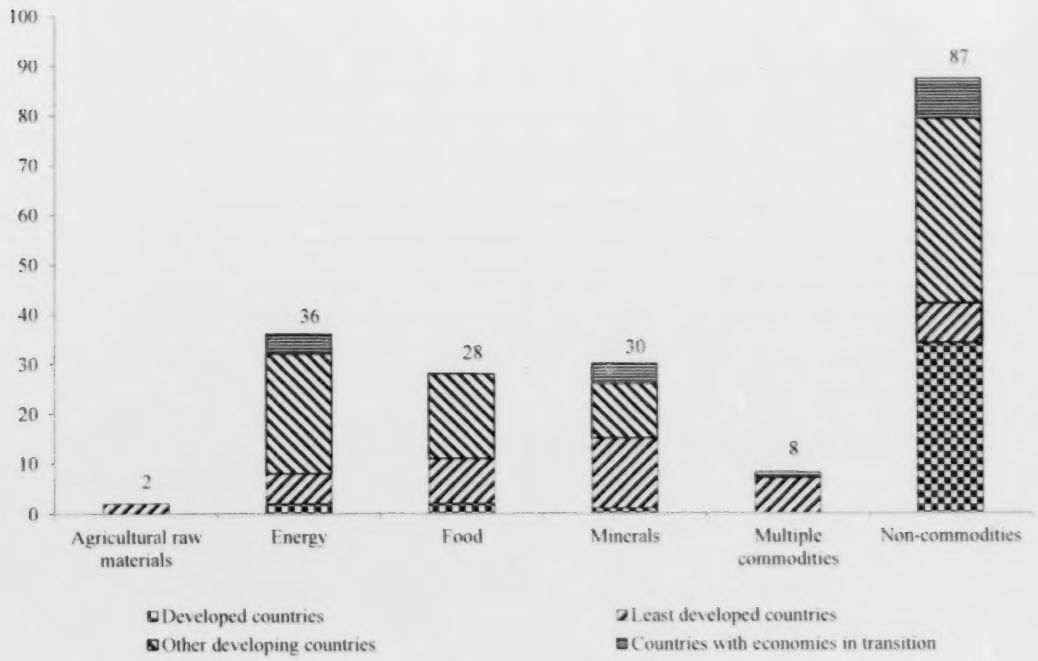
[20] Data were not available for South Sudan. The full list of least developed countries is available at http://unctad.org/en/pages/ALDC/Least%20Developed%20Countries/UN-list-of-Least-Developed-Countries.aspx (accessed 7 February 2018).

exports[21] to all trading partners between 2013 and 2016 was at least 60 per cent of total merchandise exports. As a result, 104 countries were identified as export commodity-dependent, 5 of which were developed countries, 9 were countries with economies in transition and 90 were developing countries. In the latter group, 38 countries are least developed countries. The remainder of the countries, classified as non-commodity-dependent countries, included 34 developed countries, 8 countries with economies in transition and 45 developing countries, including 8 least developed countries.

24. Subsequently, using the UNCTAD classification of commodities into groups,[22] the exports of each commodity-dependent country (that is, those with at least 60 per cent of merchandise exports made up of commodities) were classified according to whether they were dominated by agricultural raw materials; food, tropical beverages and vegetable oils and fats (food); minerals, ores and metals (minerals); or energy. Countries where one group of commodities represented at least 33 per cent of total merchandise exports during the period were considered to be dependent on that product group.[23]

25. The results of the classification by export commodity group are presented in figure 2 and in table 1. Eight countries were found where commodity exports were larger than 60 per cent of the total but where no individual commodity group reached 33 per cent of exports. They were classified as multiple commodity-dependent countries.

Figure 2
**Countries by commodity dependence and income group, 2013–2016**




[21] Available disaggregated trade data pose a challenge, as it is likely that several items registered as exports may be re-exports, given that a country does not produce a given commodity. One example among many is Switzerland, which is registered in the data as a large exporter of gold, though it has no gold mines.

[22] See UNCTAD, 2016, *State of Commodity Dependence 2016* (United Nations publication, Sales No. E.17.II.D.9, New York and Geneva).

[23] In seven countries, more than 33 per cent of their exports were concentrated in two product groups. In those cases, they were considered to be dependent on the larger of the two groups.

26. Setting out information in figure 2 by country income group provides more details on the interaction between the level of development and the type of commodities on which countries are dependent.

Table 1
**Countries by commodity dependence and income group, 2013–2016**

| *Country group* | *Agricultural raw materials* | *Energy* | *Food* | *Minerals* | *Multiple commodities* | *Non-commodities* |
|---|---|---|---|---|---|---|
| Developed countries | 0 | 2 | 2 | 1 | 0 | 34 |
| Least developed countries | 2 | 6 | 9 | 14 | 7 | 8 |
| Other developing countries | 0 | 24 | 17 | 11 | 0 | 37 |
| Countries with economies in transition | 0 | 4 | 0 | 4 | 1 | 8 |

27. Figure 1 and table 1 suggest a relationship between commodity dependence and development, as discussed in section I. While only 5 of the 39 developed countries in the sample (12.8 per cent) are commodity dependent, more than half of the countries with economies in transition and two thirds of developing countries are commodity dependent. For the least developed countries group, this figure is even higher, at 82 per cent.

28. Using data for 2016 from UNCTADstat, table 2 shows that for the 36 countries where energy exports represent more than one third of total merchandise exports, 6 are least developed countries.

29. Crude petroleum is the leading export in 24 countries, followed by natural gas in 6 countries. The share of crude petroleum is larger than two thirds of total exports in 8 countries and larger than half of total exports in 17 countries, indicating their high vulnerability to the volatility of a single commodity. The table also contains countries that are not primarily energy producers but that refine and export energy products (Greece) or store and re-export petroleum products (Saint Lucia). Greece and Norway are the only developed countries in table 2.[24]

Table 2
**Energy-dependent exporting countries, 2016**

| | *Commodity group* | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| *Country or territory* | *Food, tropical beverages and vegetable oils* | *Agricultural raw materials* | *Minerals, ores and metals* | *Energy* | *Total commodities* | *Non-commodities* | *Leading product* | *Share (percentage)* |
| Angola | 0.2 | 0.0 | 2.3 | 97.4 | 100.0 | 0.0 | Crude petroleum | 95.9 |
| Algeria | 1.1 | 0.0 | 0.3 | 95.3 | 96.7 | 3.3 | Crude petroleum | 37.8 |
| Iraq | 0.2 | 0.1 | 4.6 | 94.8 | 99.8 | 0.2 | Crude petroleum | 94.0 |

[24] Greece appears in table 2 because between 2013 and 2016, 35.3 per cent of its exports were energy products, although the figure fell to 28.1 per cent in 2016, owing to lower energy prices.

| Country or territory | Commodity group: Food, tropical beverages and vegetable oils | Agricultural raw materials | Minerals, ores and metals | Energy | Total commodities | Non-commodities | Leading product | Share (percentage) |
|---|---|---|---|---|---|---|---|---|
| Brunei Darussalam | 0.4 | 0.1 | 0.5 | 91.2 | 92.3 | 7.7 | Natural gas | 52.5 |
| Nigeria | 4.3 | 1.3 | 2.0 | 89.2 | 96.9 | 3.1 | Crude petroleum | 74.5 |
| Qatar | 0.0 | 0.0 | 2.6 | 87.9 | 90.6 | 9.4 | Natural gas | 31.7 |
| Equatorial Guinea | 0.1 | 5.9 | 0.1 | 86.6 | 92.7 | 7.3 | Crude petroleum | 68.0 |
| Kuwait | 0.6 | 0.4 | 0.7 | 85.2 | 86.8 | 13.2 | Crude petroleum | 62.2 |
| Turkmenistan | 0.7 | 4.9 | 1.0 | 84.9 | 91.5 | 8.5 | Natural gas | 74.0 |
| Azerbaijan | 5.7 | 0.4 | 5.2 | 79.8 | 91.1 | 8.9 | Crude petroleum | 69.1 |
| Gabon | 1.2 | 8.0 | 5.4 | 79.4 | 94.0 | 6.0 | Crude petroleum | 77.2 |
| Timor-Leste | 13.3 | 0.4 | 0.8 | 79.4 | 93.9 | 6.1 | Crude petroleum | 54.9 |
| Venezuela (Bolivarian Republic of) | 2.7 | 0.1 | 3.8 | 76.9 | 83.6 | 16.4 | Crude petroleum | 61.6 |
| Chad | 1.8 | 8.1 | 12.5 | 75.6 | 98.1 | 1.9 | Crude petroleum | 74.5 |
| Libya | 0.6 | 0.2 | 17.2 | 72.8 | 90.9 | 9.1 | Crude petroleum | 53.9 |
| Congo | 0.4 | 3.0 | 12.2 | 71.4 | 86.9 | 13.1 | Crude petroleum | 67.3 |
| Iran (Islamic Republic of) | 5.1 | 0.4 | 5.1 | 71.2 | 81.7 | 18.3 | Crude petroleum | 63.1 |
| Saudi Arabia | 2.1 | 0.1 | 2.4 | 70.4 | 75.0 | 25.0 | Crude petroleum | 60.9 |
| Oman | 5.8 | 0.1 | 5.2 | 69.3 | 80.3 | 19.7 | Crude petroleum | 52.2 |
| Sudan | 6.9 | 1.4 | 26.8 | 62.9 | 98.1 | 1.9 | Crude petroleum | 61.6 |
| Kazakhstan | 5.7 | 0.3 | 15.6 | 60.8 | 82.4 | 17.6 | Crude petroleum | 52.7 |
| Russian Federation | 7.0 | 3.1 | 10.1 | 56.1 | 76.3 | 23.7 | Crude petroleum | 30.7 |
| Norway | 13.5 | 0.9 | 6.6 | 55.1 | 76.1 | 23.9 | Crude petroleum | 26.5 |

| Country or territory | Commodity group: Food, tropical beverages and vegetable oils | Agricultural raw materials | Minerals, ores and metals | Energy | Total commodities | Non-commodities | Leading product | Share (percentage) |
|---|---|---|---|---|---|---|---|---|
| Saint Lucia | 15.6 | 0.2 | 4.4 | 53.1 | 73.4 | 26.6 | Petroleum oils | 53.0 |
| Trinidad and Tobago | 3.2 | 0.1 | 2.6 | 49.7 | 55.6 | 44.4 | Natural gas | 24.8 |
| Cameroon | 21.3 | 18.0 | 6.4 | 47.8 | 93.5 | 6.5 | Crude petroleum | 40.2 |
| Colombia | 17.4 | 4.7 | 6.6 | 47.5 | 76.2 | 23.8 | Crude petroleum | 26.0 |
| Aruba (Netherlands) | 23.1 | 0.1 | 15.1 | 44.1 | 82.5 | 17.5 | Petroleum oils | 39.9 |
| Democratic People's Republic of Korea | 9.6 | 1.0 | 11.8 | 44.1 | 66.5 | 33.5 | Coal | 42.7 |
| Bahrain | 4.0 | 0.1 | 22.9 | 42.4 | 69.4 | 30.6 | Petroleum oils | 29.4 |
| Yemen | 22.2 | 0.7 | 30.6 | 39.3 | 92.9 | 7.1 | Gold | 28.9 |
| Ecuador | 51.4 | 6.0 | 2.6 | 32.7 | 92.8 | 7.2 | Crude petroleum | 30.1 |
| Bolivia (Plurinational State of) | 20.5 | 0.7 | 40.1 | 32.6 | 93.9 | 6.1 | Natural gas | 28.3 |
| United Arab Emirates | 5.3 | 0.3 | 27.0 | 31.9 | 64.5 | 35.5 | Crude petroleum | 19.1 |
| Myanmar | 37.3 | 2.5 | 6.1 | 28.5 | 74.5 | 25.5 | Natural gas | 27.5 |
| Greece | 23.2 | 2.0 | 8.9 | 28.1 | 62.1 | 37.9 | Petroleum oils | 26.7 |

*Note*: Countries are listed in order of energy dependence (see column 5, Energy).

30. Export shares of the 30 countries identified as exporters of minerals, ores and metals show that 14 are least developed countries located in Africa. The only developed country in the group is Australia, a major exporter of iron ore and its concentrates. Gold is the leading product exported by 11 countries, followed by copper and copper concentrate, which together are exported by 7 countries, including exporters such as Chile, the Democratic Republic of the Congo and Peru. Iron ore and concentrates are the dominant exports in three countries, while aluminium and aluminium ore and concentrates, respectively, are the main commodity exports in two countries each. Diamonds are the top export product in Botswana and Namibia.

31. In addition to the developing countries identified as mineral-dependent countries where gold is the main export, other leading exporters of precious metals are Guinea (gold, 29.2 per cent of exports), Peru (gold, 17.8 per cent of exports), South Africa (gold, silver, platinum and platinum group, 13.2 per cent of exports) and Zimbabwe (gold, 17.9 per cent of exports). Papua New Guinea has a 5.8 per cent share of silver, platinum and platinum

group exports to add to the 20 per cent share of gold exports. This is important to highlight, as section II showed that the prices of precious metals are among the most volatile, together with petroleum and gas.

32. In 28 countries, more than one third of their merchandise exports is composed of food, tropical beverages and vegetable oils and fats. Nine are least developed countries. The top products exported by these countries vary widely; fish (five countries) and fruits (three countries) are the only top products exported by more than two countries. Of the five fish exporters, all of which are small island developing States, those that export fresh or frozen fish (Kiribati, Maldives, the Federated States of Micronesia and Palau), at least three quarters or more of their goods exports in 2016 were concentrated on that item, while half of the exports of Seychelles were concentrated on prepared fish. Many of the countries dependent on the export of food had a more diversified export structure than most of those dependent on energy and minerals.

33. Some are significant exporters of particularly volatile commodities within the foods group. For Belize (38.3 per cent of exports) and Cuba (21.7 per cent), sugar is the top export, while Swaziland and Mauritius also have export shares of sugar larger than 10 per cent. For Brazil, the world's largest sugar producer, that share is 5.8 per cent of exports. In Guyana, rice represents 10.1 per cent of total exports, another volatile commodity. Cocoa is the top export product of Sao Tome and Principe (61.5 per cent of total exports) and Côte d'Ivoire (38.2 per cent). It is also a major export of Ghana (18.4 per cent), Cameroon (13.2 per cent) and Liberia (11.3 per cent). Coffee appears as the leading export of Ethiopia (19.3 per cent of exports) and Uganda (16.1 per cent), but constitutes more than 10 per cent of the exports of Burundi (19.5 per cent), Honduras (14.7 per cent), Timor-Leste (12.6 per cent) and Rwanda (11.2 per cent).

34. Two countries depend on the export of agricultural raw materials: the Central African Republic and Solomon Islands, both exporters of wood and, in the case of the former, also cotton.

35. Eight commodity-dependent countries, seven of which are least developed countries, have relatively diversified exports among the different commodity groups, with no group representing one third of total merchandise exports. Only three countries have top product shares larger than 20 per cent.

36. Finally, this review of the top products exported by commodity-dependent countries also indicates that 36 of the 38 commodity-dependent least developed countries included in the analysis have a primary commodity (at three digits) representing more than 15 per cent of total exports and that in 28 least developed countries, this primary commodity accounts for more than one quarter of total exports. This implies that commodity dependence is coupled with strong export product concentration in many of the least developed countries.

## B. Commodity dependence, export concentration and economic performance

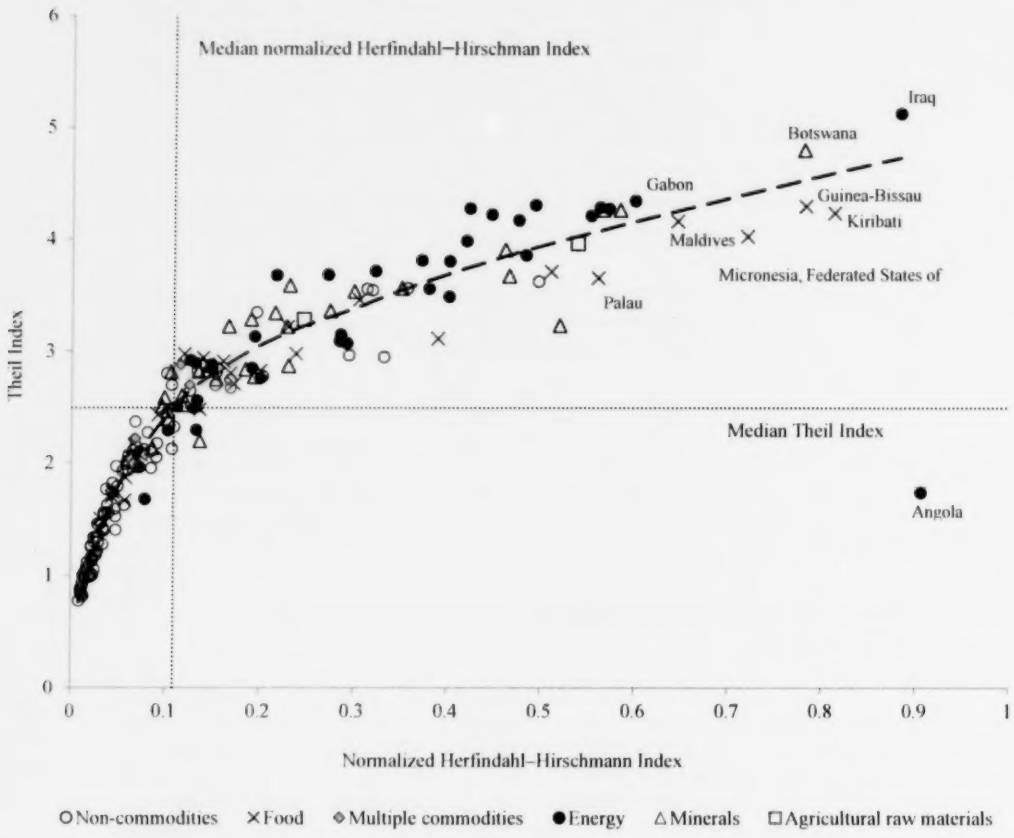
37. Different measures have been used in the economics literature[25] to assess the degree of export concentration. Two of the most widely used synthetic measures of concentration for a given time period are the normalized Herfindahl–Hirschmann Index and the Theil Index. The former adds up the square of the share of each product line in total exports, and it is normalized to take values between 0 and 1, where values close to 0 mean low concentration and values close to 1 mean high concentration. Unlike the normalized Herfindahl–Hirschmann Index, the Theil Index measures export concentration using a weighted average of the ratios of individual export lines to the mean value of total exports.

[25] See O Cadot, C Carrère and V Strauss-Kahn, 2013, Trade diversification, income and growth: What do we know? *Journal of Economic Surveys*, 27(4):790–812.

The Theil Index is not limited to values between 0 and 1. Therefore, both indices measure concentration in a country's exports but in different ways, complementing each other.[26]

38. Using the same dataset as above, the normalized Herfindahl–Hirschmann and Theil indices are calculated for the 191 countries, for the year 2016. The results are shown in figure 3, which presents a scatter plot of the concentration indices for all countries, classified according to what commodity group they are dependent on. Each commodity group in the figure is shown with a different symbol. The dotted curve is the fitted line representing the non-linear relationship between both concentration measures,[27] while the vertical and horizontal lines indicate the sample medians of each concentration measure. The non-linear relationship between the two concentration measures becomes more marked as concentration levels increase, and there are countries such as Angola that appear as very concentrated with one index but not with the other. This confirms the relevance of employing two indices that offer complementary perspectives on export concentration.

Figure 3
**Export concentration indices, 2016**




[26] A technical discussion of the advantages, disadvantages and characteristics of these and other concentration indices is available in N Palan, 2010, Measurement of specialization: The choice of indices, Working Paper 62, Research Centre International Economics (Forschungsschwerpunkt Internationale Wirtschaft, FIW).

[27] The relationship was calculated by estimating a local regression between the normalized Herfindahl–Hirschmann and Theil indices, using half the data as the span parameter.

39. Figure 3 shows that countries can be classified according to whether their concentration measures are both smaller than the median (that is to say, the countries fall into the lower left quadrant of the figure) or whether at least one concentration measure is equal or larger than the median (they fall in the other three quadrants).

40. Figure 3 highlights the following points: First, overall export concentration seems to be highly correlated with commodity dependence. Of the 90 countries that are less concentrated (those in the lower left quadrant), 69 countries (76.7 per cent) are not commodity dependent, while 83 of the 101 countries that have more concentrated exports (82.2 per cent) are commodity dependent.

41. Second, there seems to be a strong correlation between a country's development level and the degree of export concentration, as discussed previously. Thirty-four of the 39 developed countries (87.2 per cent) in the dataset are less concentrated, while 40 out of 46 least developed countries (87 per cent) are among the more concentrated country group.

42. Third, dependence on some commodity groups would appear to be associated with higher export concentration. Thirty-three out of 36 countries (91.7 per cent) classified as energy dependent, as well as 27 out of 30 countries (90 per cent) classified as minerals dependent, are in the group of more concentrated countries. In contrast, food-dependent countries seem in general to be less concentrated than energy countries, with the exception of some least developed countries such as Guinea-Bissau and Kiribati, and small island developing States such as the Federated States of Micronesia. Also, the multiple commodity-dependent countries have in general low concentration levels, similar to those of many non-commodity exporters (see paragraph 25).

43. A statistical test is carried out to analyse further the relationship between concentration, development level and type of commodity a country depends on, as suggested in figure 3. The main results, which are valid for both the normalized Herfindahl–Hirschmann and Theil concentration indices, are as follows:

(a) Both the level of development (proxied by country income group) and the type of product that dominates exports are significantly correlated with the level of concentration of a country;

(b) Commodity-dependent countries are on average more concentrated than non-commodity exporters, independently of the level of income;

(c) Which commodity a country depends on for its exports matters for export concentration. Energy-dependent countries are more concentrated than food-dependent countries.[28]

(d) Concentration is higher in poorer countries than in richer ones. Moreover, the least developed countries have the highest concentration measure, followed by other developing countries and countries with economies in transition.

44. These stylized facts point to a number of policy actions that may help commodity-dependent countries reduce their export concentration, and by the same token, increase their socioeconomic development. These are discussed in the following section.

## IV. Policies for economic and export diversification, and value addition

45. Policies designed to address commodity dependence and export concentration must take into account country specificities, including the type of commodity a country is dependent on and the major constraints on diversification. For example, the type of diversification strategy that may be carried out in a country dependent on energy exports such as oil might be different from a strategy that is feasible in a country relying on an agricultural commodity such as cotton. While the former might wish to focus on building linkages between the enclave oil sector and the rest of the economy, the latter might

[28] Only the comparison between the energy and food groups was found to be significant.

consider adding value to cotton lint as the most relevant strategy to produce cotton fabrics and clothes for final consumption.

46. These policies may nevertheless be grouped into two broad categories:

(a) Horizontal policies that aim at generating the overall economy-wide conditions that are needed for diversification and value addition to occur;

(b) Targeted policies that are specifically directed at industries, sectors or products in order to promote these objectives.

## A. Horizontal policies

47. There is agreement that successful diversification requires human and physical capital accumulation, including infrastructure; the improvement of science and technology capabilities; and the strengthening of institutions and governance. Commodity-dependent countries are generally advised to use the rents obtained from the export of natural resources to build capacities in these areas. Hence, investing in education, health, infrastructure and security; strengthening the rule of law and investor and consumer rights; fostering government transparency and efficiency; and improving the ease of doing business may contribute to productivity increases, diversification and value addition across the economy.

48. Diversification requires macroeconomic stability. This involves implementing macroeconomic policies, especially fiscal and monetary policies that ideally mitigate fluctuations in macroeconomic variables such as gross domestic product, inflation, exchange rates and others, or at the minimum do not contribute to instability. First, a country needs to reduce volatility in public revenue and expenditure. This is a challenging objective, given limited public revenue in many commodity-dependent countries,[29] large demands on Government for the provision of goods and services, and the volatile nature of revenue associated with commodity price volatility, as well as the resulting volatility of national income. Therefore, proper management of fiscal policy during commodity upward cycles is key to building fiscal space for use during the future downward part of the commodity cycle.

49. Specific policy tools that may help to stabilize public revenue and/or expenditure include the effective use of multi-year budgets, a practice adopted in many countries and which has proven its worth in relation to fiscal performance.[30] Also, it is important to carefully manage sovereign funds, in the interest of income stabilization and intergenerational equity, where relevant. The Pula Fund (Botswana) and the Social and Economic Stabilization Fund (Chile) are cases in point. Implementing binding fiscal rules of different types, including balance rules, expenditure rules and debt rules, could be another avenue for the improvement of fiscal management.[31] Indeed, it has been shown that the use of fiscal rules had a stabilizing role for fiscal policy in Latin America.[32] Furthermore, when possible, leveraging public expenditure in capital formation by mobilizing private investment in infrastructure, for example through the use of public–private partnerships, could be useful.

50. Second, for commodity-dependent countries where monetary policy is an effective policymaking instrument, it can be a powerful tool in the drive towards economic and export diversification and value addition. Such a policy would contain the following four important components:

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[29] Reasons for this include narrow tax bases, limited institutional capacity for tax enforcement, political economy factors and illegal financial flows.

[30] See R Vlaicu, M Verhoeven, F Grigoli and Z Mills, 2014, Multi-year budgets and fiscal performance: Panel data evidence, *Journal of Public Economics*, 111(C):79–95.

[31] See V Lledó, S Yoon, X Fang, S Mbaye and Y Kim, 2017, Fiscal rules at a glance, International Monetary Fund, March.

[32] E Alberola, I Kataryniuk, A Melguizo and R Orozco, 2017, Fiscal policy and the cycle in Latin America: The role of financing conditions and fiscal rules, Organization for Economic Cooperation and Development Centre Working Paper No. 336.

(a) Attaining a low and stable inflation rate. This reduces uncertainty about future prices, facilitating investment planning that could foster diversification and value addition. Countries with flexible exchange rate regimes such as Chile, Colombia and Peru, with help from sustainable fiscal policies, have successfully attained low and stable inflation rates;

(b) Stabilizing economic activity in the face of a shock. Private investment, especially investment in higher productivity sectors that often have a longer maturity period or higher sunk costs, benefits from more stable national income and other macroeconomic aggregates. This can be particularly important when fiscal policy cannot act in a countercyclical way, as is the case in many commodity-dependent countries, especially in the least developed countries;

(c) Reducing exchange rate volatility. Exchange rate volatility makes the ex ante expected profitability of firms riskier through mechanisms such as balance sheet effects (for example, when debt is denominated in foreign exchange) and increases risk in future input and output prices, including the cost of financing, capital and imported intermediate goods and services. For commodity-dependent countries, including middle-income countries such as those in South America, integration into international capital markets increases fluctuations in the exchange rate as a result of commodity price movements. This raises the cost of reducing exchange rate volatility. Hence, during the last commodity price boom, several countries implemented measures that restricted some types of capital inflows, especially short-term ones, for example through taxation. This was the case in Brazil.[33] Countries such as Peru have succeeded in reducing exchange rate volatility using tools such as direct market intervention, derivatives, macroprudential measures and expectations management;

(d) Contributing to the stability of the financial sector by using macroprudential policies, especially for countries that are more integrated into international capital markets. For example, Brazil has used financial transaction taxes and unremunerated reserve requirements to address large short-term capital inflows.

51. In practice, it is difficult to harmonize these different components of monetary policy. Therefore, modern central bank practices in developing countries, especially in countries that have commodity currencies, vary in terms of which objectives are explicitly and implicitly acknowledged as being pursued, and in which order of priority, taking into account each country's specific circumstances. For example, the flexibility provided by fiscal policy and the magnitude and type of shocks, as well as sociopolitical factors, are important determinants of what type of monetary policy is pursued de facto.

52. The use of monetary policy as a stabilizing tool requires a sufficient degree of monetary policy independence, implying the absence of complete fiscal dominance and the pursuit of a sufficiently flexible de facto exchange rate regime. Where these conditions are not met, fiscal policy becomes the only stabilizing tool, reinforcing the need for a sustainable fiscal policy for stabilization and setting the stage for diversification and development.

53. A third type of horizontal policy involves minimizing exchange rate overvaluation. This requires a concerted effort going beyond central banks and involving, in particular, the fiscal authorities. Reserve accumulation can be costly,[34] and therefore should be only one tool among others that directly address the sources of overvaluation. Others could include sovereign funds that accumulate foreign exchange and measures to manage capital movements, such as taxes and mandatory deposits. Importantly, policy action should balance the expected effects of overvaluation on diversification, growth and development with the expected cost of measures put in place to address it.

[33] See K Habermeier, A Kokenyne and C Baba, 2011, The effectiveness of capital controls and prudential policies in managing large inflows, International Monetary Fund Staff Discussion Note SDN/11/14, August.

[34] These costs include the actual quasi-fiscal cost of acquiring reserves, its opportunity cost, and reputational risks to the credibility of central banks in pursuing the objectives mentioned above.

## B. Targeted policies

54. Diversification can also benefit from properly designed and implemented public policies that target specific market failures. A review[35] of the theory and the empirical experience around the world with targeted policies, also known as industrial policies, indicates that a successful implementation that balances risks and benefits is a delicate task. It requires, on the one hand, avoiding the pitfalls of discretionary sectoral policies that often fail due to rent seeking and corruption; dropping "losers", despite existing sociopolitical costs; and effectively identifying sectors with high spillovers in the country. On the other hand, proper implementation of targeted policies requires capacity to target existing problems and solving them in a welfare-improving way, especially in countries with limited institutional capacity. Importantly, targeted policies may strengthen the existing set of complex extant capabilities available in a country, given its existing productive structure.[36]

55. Targeted policies play two major roles. The first involves addressing coordination problems. These appear when a sector or industry sees its capacity to expand and add value hindered by challenges upstream or downstream in the value chain such as lack of availability or quality of necessary inputs, or issues with potential buyers such as their location and size, and horizontal constraints such as the number and size of competitors (economies of agglomeration and scale).

56. Coordination problems can be addressed by different means, such as fostering foreign direct investment in specific areas of the value chain, strengthening business associations that focus on sectoral competitiveness and moving up the quality ladder, facilitating technology acquisition or innovation to address specific challenges. Overall, this requires working closely with the private sector, including business associations, cooperatives and other entities that help identify specific market failures hindering sector growth and diversification.

57. For example, the Malaysian Palm Oil Board instituted a yearly prize for innovative products in the industry, which includes new machinery specifically targeted at increasing productivity under local conditions. Among many achievements, this has led to the introduction of different machines, such as mechanized palm cutters.[37] Other agricultural machinery specifically adapted to local circumstances have also been invented, increasing productivity in the Malaysian palm oil sector and fostering backward links with the equipment manufacturing industry, a form of diversification.

58. Another means of addressing coordination problems is by targeting the provision of public goods and services to deal with a particular sectoral problem, such as infrastructure projects, cluster-support measures and the setting up of export-processing zones.

59. The second major role of targeted policies concerns addressing the process of profitability discovery problems. Before entering a new market, potential investors do not know how profitable a new activity will be; therefore, they must incur sunk, upfront costs in order to "discover" these profits.[38] However, once the new activity is found to be profitable, it attracts new entrepreneurs and more competition, which may lower profits. Therefore, this reasoning results in insufficient market entry, ex ante. Government interventions may include setting up an export promotion agency, rural extension services and other measures that reduce informational asymmetries.

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[35] A Harrison and A Rodriguez-Clare, 2010, Trade, foreign investment, and industrial policy for developing countries, in D Rodrik and M Rosenzweig, eds, *Handbooks in Economics: Development Economics*, 5: 4039-4214 (North-Holland, Oxford).

[36] R Hausmann and CA Hidalgo, 2011, The network structure of economic output, *Journal of Economic Growth*, 16(4):309–342.

[37] See http://www.mpob.gov.my/en/technologies-for-commercialization/achievements and http://palmoilis.mpob.gov.my/tot/index.php/select-year/55-new-technologies-2017/new-technology-transfer/887-tt-no-613-battery-powered-oil-palm-harvesting-tool (accessed 9 February 2018).

[38] See R Hausmann and D Rodrik, 2003, Economic development as self-discovery, *Journal of Development Economics*, 72(2):603–633.

60. Both export promotion agencies and rural extension services can increase access to available market opportunities to potential producers and provide valuable information that can foster diversification. Export promotion agencies may be particularly useful in efforts to differentiate agro-industrial products according to the needs of specific foreign markets with respect to tastes and packaging, for example. Furthermore, rural extension services often monitor and disseminate market prices for products and agricultural inputs such as fertilizers, and facilitate technology adoption as well. For example, in Chile, the Government maintains a free service of daily price quotations for different public markets in the country that allows farmers to rapidly determine daily prices of a variety of agricultural products, including fruits and vegetables.[39] In Argentina, the agricultural extension service[40] provides a variety of services to farmers aimed at fostering better agricultural practices and has been important in the past in the adoption of technologies such as no-till cultivation.

61. Competition policy can also be a powerful tool to foster diversification and value addition.[41] In particular, the abuse of market power upstream or downstream in a value chain may generate relative price distortions that can negatively affect diversification and value addition downstream by reducing private investment in the non-resource sectors of commodity-dependent countries. This occurs, for example, if market power raises prices of important inputs such as capital, intermediate goods or logistical services, and/or by reducing the prices obtained by producers who do not sell to final consumers. A recent example of competition policy addressing such problems was the fining (R37 million) by the Competition Commission of South Africa in July 2017 of two chemical companies for price fixing and dividing markets.[42] Another example relates to the structural and behavioural remedies applied in 2010 to the anticompetitive practices identified in the nitrogen fertilizer market.[43]

62. Targeted policies to foster diversification and value addition may focus on different policy mixes in energy and mineral-dependent countries, compared with food or agricultural raw material-dependent countries. For countries that are dependent on the export of food, tropical beverages and vegetable oils, as well as for many types of agricultural raw materials, targeted policies can, in particular, support climbing the value chain by fostering activities that are closer to existing ones in the product space (vertical integration). This implies devoting significant effort to diagnosis of the sectors and products involved, including characteristics and opportunities, identifying bottlenecks and other constraints on moving up the value chain or adding value through quality improvements and differentiation, and putting in place adequate complementary policy measures to tackle challenges such as those mentioned above.

63. As value addition to commodities such as coffee and cocoa often involve differentiation through careful quality control, traceability of inputs, the fostering of sustainable practices, and control of the value chain up to the final consumer, efforts to strengthen each of these elements by public–private cooperation are often important, as proven by the case of Colombia. The work of the National Federation of Coffee Growers of Colombia, with the support of the Colombian Government, has resulted in quality

[39] The Office of Studies and Agrarian Policies (Oficina de Estudios y Políticas Agrarias) is a dependency of the Ministry of Agriculture of Chile and provides these price quotations (http://www.odepa.cl/precios/, accessed 9 February 2018).

[40] The National Institute of Agricultural Technology of Argentina (Instituto Nacional de Tecnología Agropecuaria), established in 1956, provides a variety of services to farmers. See www.inta.gob.ar (accessed 9 February 2018).

[41] Although often considered a horizontal policy, competition policy can also be considered a targeted policy that addresses coordination problems, as it acts at the sectoral level and in a developing country with limited resources (such as government human resources), requiring de facto the prioritization of monitoring and addressing market power.

[42] See http://www.compcom.co.za/wp-content/uploads/2017/01/TWO-CHEMICAL-COMPANIES-FINED-R37M-FOR-CARTEL-CONDUCT.pdf (accessed 9 February 2018).

[43] S Grimbeek, G Giya and O Mahlalela, 2017. The impact on competition in the fertiliser industry after the Sasol divestiture of blending facilities in 2010, Competition Commission of South Africa Working Paper 1.

improvement and incremental value addition, for example, through exports of lyophilized coffee, reaching consumers directly in many different countries through the Juan Valdez coffee chain.[44]

64. Energy and mineral extraction are high capital-intensive-activities that are often enclaves, frequently in remote areas. This means that the strength of forward and backward links to industrial activities with higher value added, especially ones with low volatility, may be weaker than for food and activities related to agricultural raw materials. Therefore, for countries that are dependent on the export of energy or minerals, ores and metals, targeted policies may be especially useful when focused on the development of high-value service industries, such as exploration services, catering and legal services. For this to happen, a country needs adequate human resources. This need brings into focus the role of government in planning and coordinating activities with domestic and foreign players. For example, generating skills to meet specific sectoral needs might require cooperation with domestic and international training institutions for capacity-building purposes.

[44] See https://www.federaciondecafeteros.org (accessed 9 February 2018).